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A
THIRD DISSERTATION
ON
F E V E R.
PART I.

CONTAINING THE
HISTORY AND METHOD OF TREATMENT
OF A
REGULAR CONTINUED FEVER,
SUPPOSING IT IS LEFT TO PURSUE ITS ORDINARY COURSE.

Medicina igitur adhuc taliter comparata est, ut fuerit magis ostenta quam elaborata; etiam magis elaborata quam amplificata.—BACON, AUG. SC. LIB. II, CAP. I.

Solent autem homines naturam tanquam ex præalta turri & e longo despicere, & circa generalia nimium occupari; quando si descendere placuerit, & ad particularia accedere, resque ipsas attentius & diligentius inspicere, magis vera & utilis fieret comprehensio.—Ibid.

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LONDON:

PRINTED FOR J. JOHNSON, ST. PAUL'S CHURCH-YARD.

M.DCC.XCVIII.

ORLANDO FURIOSO,

CANT. 35.

XII.

DICO, che come arriva in su la sponda
Del fiume quel prodigo Vecchio, scuote
Il lembo pieno; e nella torbida onda
Tutte lascia cader l'impresse note.
Un numer senza fin se ne profonda,
Ch' un minimo uso aver non se ne puote,
E di cento migliaja, che l' arena
Sul fondo involve, un se ne serva appena.

XIII.

Lungo, e d' intorno quel fiume volando
Givano corvi, ed avidi avoltori,
Mulacchie, e varj augelli, che gridando
Facean discordi strepiti, e romori;
Ed alla preda correan tutti quando
Sparger vedean gli amplissimi tesori;
E chi nel becco, e chi nell' ugnà torta
Ne prende, ma lontan poco li porta.

XIV.

Come vogliono alzar per l' aria i voli,
Non han poi forza, che 'l peso sostegna,
Sì che convien che Lete pure involi
De' ricchi nomi la memoria degna.
Fra tanti augelli son duo cigni soli
Bianchi, Signor, come è la vostra insegna,
Che vengon lieti riportando in bocca
Sicuramente il nome, che lor tocca.

XV.

Così contra i pensieri empj, e maligni
 Del Vecchio, che donar li vorria al fiume,
 Alcun ne salvan gli augelli benigni;
 Tutto l' avanzo obblivion consume.
 Or se ne van notando i sacri Cigni,
 Ed or per l' aria battendo le piume,
 Fin che presso alla ripa del fiume empio
 Trovano un colle, e sopra il colle un Tempio.

XVI.

All' Immortalitade il luogo è sacro,
 Ove una bella Ninfa giù del colle
 Viene alla ripa del Leteo lavacro,
 E di bocca dei Cigni i nomi tolle;
 E quegli affigge intorno al simulacro,
 Che in mezzo il Tempio una colonna estolle:
 Quivi li sacra, e ne fa tal governo,
 Che vi si pon veder tutti in eterno.

ERRATA.

- Page 10, line 17, *et passim*, for erysepelalous, read erysipelatous.
 13, line 5, for arise, read arises.
 38, line 13, for the, read an.
 61, line 22, after six o'clock, insert in the evening.
 92, line 9, for coruse, read course.
 111, line 14, for attempting, read attempted.
 120, line 4, for 1797, read 1757.
 202, line 19, for solid, read solids.
 208, line 3, for will, read shall.
 212, line 2, for sence, read since.
 227, line 1, for then, read there.

A

THIRD DISSERTATION, &c.

AN ephemera, or fever consisting of one paroxysm only, or, in other words, of a cold fit, hot fit, and crisis, is easily distinguished from any other disease; nor is it difficult to distinguish an intermitting fever, if regular, as it consists of several paroxysms, similar in all their parts to the one paroxysm of an ephemera. But a fever going on for many days without any appearance of crisis; having only one marked crisis after a continuance of two or three weeks, or perhaps going off without any marked crisis, is with difficulty distinguished from many other diseases.

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This

This seems to be the principal cause of the confusion found in the works of even practical authors, who have treated on this disease. Should the author also fail in discriminating it, he will have this consolation, that he has failed with many of the first practitioners who have written on this subject.

A fever which continues for three, four, five weeks, or even longer, without any marked crisis, and afterwards goes off by degrees, one critical symptom happening after another, is only, in the author's opinion, a repetition of ephemeræ, where the subsequent paroxysm begins before the crisis of the former has begun to take place.

It has been shewn, in the Treatise on a regular tertian, that at the beginning of the disease the succeeding paroxysm often commences before the beginning of the crisis of the preceding one: were this to continue to the end of the disease, it would be a continued fever. It has also been noticed,
that

that if one very perfect crisis should take place, it sometimes terminates an intermittent; but that when the disease is not so carried off, it gradually diminishes after a certain time, and ceases entirely.

A regular continued fever begins in the same manner, increases for a certain time, remains nearly in the same degree for some time, diminishes from no apparent cause, and leaves the patient. Or otherwise, a crisis takes place during some part of its progress, either carrying it off altogether, or converting it into an intermittent.

A fever is a disease of the whole system. If a disease of a part, therefore, should go off while the cause remains, and the system should not be generally affected in a greater or less degree, it ought not to be considered as fever.

One criterion of a regular continued fever is, that it increases for a certain time from its beginning, remains for some time in its greatest degree, or as the Greeks call it acme, then, without any apparent cause,

B 2

gradually

gradually diminishes, and terminates in health. Or otherwise, a crisis takes place during its progress, and carries off the disease; or the crisis converts it into an intermittent; or otherwise in its progress it produces topical inflammation; or kills the patient. Any disease, not having these qualities, is not a regular continued fever.

The author has before remarked, that when a cause is applied which produces fever, it produces it *uno ictu*, at a blow; and the disease continues afterwards, although the cause be no longer applied; neither is it increased, diminished, or altered by the farther application of its cause. The author, therefore, would not admit any affection of the general system to be a fever, which depends upon the constant application of the original cause.

Should a disease arise with frequency of the pulse, and other affections of the whole system; but if these general affections should not be such as are commonly found in fever; that is, if there should not be contraction

traction of the vessels, depression of strength, affection of the stomach, &c. although the disease should arise from a cause, the continuance of which is not necessary for the continuance of the disease, and the disease should gradually increase, remain for some time with a certain degree of violence, then gradually diminish and go off, nevertheless it must not be considered as fever.

The following rules may be applied for distinguishing the several diseases which have been called fever from that disease.

When the disease has a tendency, after having increased to a certain degree, gradually to diminish, and go off without any apparent cause.

This is a property of fevers, but not of fevers only. Acute rheumatism, when no medicine whatever is exhibited, increases for a certain length of time, rises to a certain height, continues for a time in an equal degree, then gradually abates and leaves the patient. Hemisrania encreases for a time,

then continues in the same state, although a much longer time than acute rheumatism, and afterwards leaves the patient without any apparent cause whatever, seeming only (if the expression may be used) to grow tired of a longer stay. Some cause, however, there must be for all such increase and diminution, although it has not yet been discovered.

This criterion of fever, therefore, is unfit for universal application; but it may be applied in many cases; as for distinguishing the disease called hectic fever. This disease sometimes agrees with regular continued fever, in arising without apparent cause; but it commonly arises from, and is kept up by the constant application of an apparent cause. There is coldness, paleness, and other symptoms of depression of strength and contraction of the small vessels: these are followed by heat, frequency of the pulse, foulness of the tongue, and other symptoms of the hot fit of fever. The attacks and subsequent apparent hot fits take place in the evening, terminating

minating in the morning, often with several critical symptoms. Sometimes indeed the attack happens in the day-time, but not commonly. This disease has been frequently called fever, but it wants this essential property, that where it does not arise from an apparent cause, and often when its cause is removed, it has no disposition to go off of itself, but remains until it destroys the patient. This want of means of curing itself excludes it from the class of fevers.

In tetanus contraction often takes place in the muscles of various parts of the body, continuing for a certain length of time, without any apparent intermediate relaxation; the general system is often affected, the pulse becomes frequent to a hundred and twenty strokes in a minute or more: there is, however, no other appearance of fever in the system; the patient is often in a profuse sweat, the tongue is clean, and the stomach not much affected. This affection of the system often arises without any apparent cause, and frequently after some other disease has gone off, as after the cure of a

fever, or the healing of an ulcer ; it increases to a certain degree, continues for a certain length of time, diminishes, and goes off.

The same affection of the system arises not uncommonly with little or without any spasmodic contraction of any of the muscles of the body. Although this case has not been remarked by any writer the author is acquainted with, yet he has seen it several times. First, where there has been spasmodic contraction in particular parts of the body, the affection of the system has been greater than in proportion to such spasmodic contraction. Secondly, when there has been no spasm in any part, and therefore the affection of the system subsists without any continued cause applied. This affection cannot be called fever, because it totally disagrees with it in its appearances.

Should a phlegmonous inflammation arise in any part of the body of a strong young person, distending the part considerably, and accompanied with violent pain ; as the inflammation increases, the pulse becomes hard, full, strong, frequent and synchronous ;

chronous ; considerable degree of heat and of general tension takes place all over the body ; the tongue is covered with white fur, the patient has head-ach, feeling as if his head would burst ; pains in the extremities, and great sense of heat : these appearances gradually subside, when the phlegmonous inflammation has suppurated, and the pus has made its exit externally ; they are therefore kept up only by a constant apparent cause, and are consequently excluded from fevers ; or should the inflammation be cured by any means, this affection of the system also goes off in the same manner, so that the affection of the system evidently depends on the topical affection, and therefore is not fever.

Should rheumatism arise in any part of the body, all the appearances in the system just enumerated take place, and continue often as long as the rheumatic affection continues in any part, or parts of the body. But when the rheumatic affection has gone off, these appearances gradually subside also, and leave the patient. Sometimes, when the rheumatism is not in fact cured, but has
left

left the patient in appearance free from disease, after a short pause a metastasis takes place to the head or breast, and soon proves fatal. This remission of the symptoms is nothing like an intermission of fever, for which reason it is here noticed.

Similar appearances take place in the system in the gout, and in other diseases which depend entirely upon their apparent cause; increasing as that cause increases, diminishing when it diminishes, and going off when it is removed.

These appearances have often been called inflammatory fever, or general inflammation, but are excluded from the class of fevers by their dependance upon their cause.

Should erysipelatous inflammation arise on the skin, it often happens, after the inflammation has taken place, that the pulse becomes frequent to 120 strokes in a minute or upwards; the strength of the patient is universally depressed, there is head-ach, foulness of the tongue, loss of appetite, nausea; the sense of heat is very much increased, as also the degree of heat to 100° ,
or

or 103° , or 104° ; there is dryness of the skin, and obstruction of the pulse. These symptoms are all very much increased in the evening; and there is some degree of relaxation of them in the morning. This disease is extremely similar to fever, yet it is to be excluded from that disease by its total dependance upon its cause, the erysepelalous inflammation of the skin; for if that be removed by application of alkohol, diluted with water, to the inflamed part only, all these affections of the system generally go off.

Should an erysepelalous inflammation arise in the throat, producing whitish sloughs in it, similar symptoms appear in the system; but if the inflammation be carried off by the exhibition of large quantities of the bark of the cinchona, and the whitish sloughs be made to fall off, so that all disease shall be removed from the mucous membrane of the throat, the affection of the system generally ceases. This affection of the system, therefore, cannot be ranked among fevers, according to the rule, which excludes from fevers diseases

depending on the constant application of their cause.

Should phlegmonous inflammation take place in any part of the duodenum, jejunum or ilium ; and after the inflammation has taken place, as shewn by the pain, if the strength be greatly depressed, if the pulse should become hard, frequent to 120 strokes in a minute or upwards, and much contracted ; if there should be a thick brown fur upon the tongue, great sense of heat, head-ach, paleness, and contraction of the skin, nausea and vomiting ; if there should even be delirium ; let the inflammation of the intestines be cured by copious bleeding from the arm and skin of the abdomen, by the application of sedative and relaxing fomentations to the abdomen ; all these symptoms in the system generally will subside and go off, and therefore cannot form a disease which ought to be included in the class of fevers.

In treating of the ephemera it has been observed, that in the middle of the hot fit a
topical

topical inflammation sometimes arises and carries off the fever. Thus, for example, in an hour or two after all the appearances of a paroxysm of fever have taken place, a pain arise in the side a little below the clavicle. The pulse either was, before the pain in the side took place, or becomes afterwards, very hard, full, and strong, accompanied with difficulty of breathing, increased pain of the side on inspiration, and all the other appearances, which would have arisen had a phlegmonous inflammation taken place in the pleura without any preceding cold or hot fit. In the latter case, if large evacuations be made by bleeding from the arm and skin of the breast, the inflammation of the pleura is carried off, and every morbid affection of the system ceases in consequence; but it sometimes happens that the inflammation being carried off from the pleura, that is the pain having left the side, and the difficulty of breathing having ceased, the frequency of pulse, heat, and all the other symptoms of fever remain notwithstanding, and go through the course of a regular continued fever. This case the author finds a difficulty

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difficulty in discriminating; but he conceives that an ephamera had taken place in the first instance; that the inflammation of the pleura had cured this ephamera; that the inflammation being carried off by the evacuation, or other remedies, no fever remained in those cases where the symptoms entirely ceased on the cessation of the inflammation; but that when the febrile symptoms continued after the pleurisy was cured, a regular continued fever had been diminished by the inflammation of the pleura, but not entirely carried off; that therefore when the pleurisy was cured, the fever went on as it would have done if no such inflammation had happened.

It may be said, that it were more simple to consider all these affections of the system as fever; but it has been always thought, that in scientific subjects nice distinctions should be made where they actually exist, in order to discriminate the natural properties of bodies. In botany, for example, a superficial observer would rank together all beautiful and sweet-scented plants under the
name

name of flowers; all plants whose seed gives nourishment to mankind, under the name of grain; all plants whose leaves, stems or roots are eatable, under the name of pot-herbs, and reckon all others weeds; while the botanist would carefully distinguish between the figures and qualities of plants similar to each other in any one respect. Some consider all noises the same; a musician carefully distinguishes a semitone. Were diseases studied merely to investigate their properties, it would still be worthwhile to enter into accurate and minute distinctions; but they become of much greater moment when the object is to alleviate and remove the disease.

One object in view in laying down the above distinctions, is to discriminate between diseases where it is only necessary to remove their cause to cure the patient, and those where other circumstances of the disease are of moment.

In what is called hectic fever, which continues often after its cause is removed, as it
does

does not produce any means of its own cure, some must be employed to carry off the disease, without attention to its own ordinary progress.

If a disease depends solely upon its cause, it is sufficient to remove that cause, and in general attention to the disease itself is unnecessary. Should a phlegmonous inflammation produce the appearances similar to those of a paroxysm of fever, medicines are to be employed that will carry off the topical inflammation without attending to the general affection of the system, excepting that this general affection must sometimes be considered as an accident that may in itself be mischievous. Where phlegmonous inflammation cannot be cured, if it should not prove fatal, from affecting some organ necessary for life, the inflammation must be allowed to suppurate, and the suppuration must even be forwarded very frequently by means increasing the general affection of the system, instead of employing medicines to diminish or remove it. Whereas in fever, on the other hand, the whole attention is directed

rected to the application of remedies that will either remove the disease, or make it go through its natural course without danger to the patient, or with a less degree than it otherwise would, totally neglecting the cause which first produced it.

General inflammation excited by a disease affecting some part necessary for life, might however be fatal, independent of the topical inflammation which occasioned it. In this case it would be necessary to employ means to take off the general inflammation; but they are commonly the same as those which take off the topical inflammation, and totally different from those that should be employed to take off fever.

When rheumatism excites general inflammation, the general inflammation frequently appears to be the principal disease; and until lately practitioners have thought it ought to be carried off by large evacuations, especially by bleeding. Dr. Hugh Smith, an extraordinary practitioner, conceived that the evening attacks of violent pain, frequently

happening in acute rheumatism, were the returns of the paroxysms of an intermittent. He therefore exhibited the bark of the cinchona, in the quantity of an ounce and an half, during the interval of the pain, although the pulse continued hard, full, strong and frequent, and thus succeeded in preventing the return of the pain. This practice has since been adopted with success by many practitioners. Some have even employed the bark of the cinchona in acute rheumatism, where there was no remission of pain, but in the cases the author has seen, without effect. While it was the practice to remove the general inflammation by bleeding, metastasis frequently took place to the interior parts of the body, and destroyed the patient. This accident in the author's practice during the last fifteen years has rarely happened. In this period he has entirely left off bleeding in acute rheumatism; and has not lost above two or three patients, although he has treated several hundreds in this disease. This may be considered as a digression; but it is intended to shew, that general inflam-

inflammation, in this case, has nothing in its treatment similar to fever.

If in the gout, or in other diseases where general inflammation takes place, unless it were so violent as immediately to threaten the destruction of the patient, large evacuations by bleeding certainly should not be made, nor any means be employed to carry it off, which would increase the original disease. In managing the gout, or other such diseases, in the best manner, remedies must sometimes be employed which evidently tend to increase the general inflammation.

If in consequence of an erysipelatous inflammation of the skin the pulse should become frequent to 120 strokes in a minute, or upwards, there should be universal depression of strength, and other symptoms of general affection of the system, they ought not to be attended to, but solely the erysipelatous inflammation of the skin, as on the cure of that, the affection of the system would cease.

In erysepelatous inflammation of the throat, producing whitish sloughs in it, the general affection of the system is not to be attended to; but the practitioner should endeavour to carry off the erysepelatous inflammation and remove the sloughs, without attending to the frequency of pulse, heat, or any part of the affection of the system generally.

If from inflammation of the duodenum, jejunum or ilium, there should arise great depression of strength, frequency and smallness of the pulse, with other symptoms of general affection of the system, an experienced practitioner would not employ cordials, or peruvian bark, to support or increase the strength; nor would he attend at all to the general affection of the system, but would endeavour to cure the inflammation in the intestine, without paying the least attention to the general affection of the system.

If an attack should take place similar to the attack of an ephemera, and violent pain should arise in the side, a little under the clavicle,

clavicle, increasing upon inspiration, the pulse becoming hard, full and strong, and other symptoms of general inflammation taking place; if by making large evacuations by bleeding from the arm and skin of the breast, by blisters and other remedies, the pain should be entirely removed from the side; if notwithstanding the general affection of the system should not go off, that general affection is then undoubtedly to be attended to. If, during the existence of the pleurisy a practitioner is enabled to determine, that although the pleurisy should be carried off, the affection of the system would still remain, in this case the general affection is to be attended to, both during the pleurisy and after it is carried off. These distinctions, however important, have hardly ever been made matter of enquiry.

A regular continued fever takes place exactly in the manner of an ephemera, or a regular tertian; nor would it be possible, from the appearances of the disease, to determine whether it would be an ephemera simplex, a regular tertian, or a regular con-

tinued fever. The circumstance of a patient's living in a country, where intermittents were endemic, from moisture or putrefaction, arising in marshy grounds, in warm climates; or of intermittents being from any cause epidemic in dry countries, might make a practitioner suspect that the disease would be an intermittent or remitting fever. But without such circumstances, no appearance in the patient himself would, within two or three hours of the attack, at all enable him to determine what kind of fever it would prove.

Continued fevers sometimes then begin at once exactly with the same symptoms as an ephamera. At times, however, there arises immediately upon application of the cause of disease, particularly if it should be exposure to cold, putrefaction, or infection, some derangement of the system, but no complete paroxysm of fever. These derangements consist of languor, the patient's feeling himself not perfectly well, and being unable to exert the powers of his body or his mind, whether for business or amusement, so perfectly

fectly as when in absolute health. Sometimes his sleep is disturbed; he does not go to sleep readily; his sleep during the night is broken, and he is not refreshed so much as usual. It happens sometimes that these symptoms go off in a few days; sometimes they all at once increase very considerably, and form a paroxysm, which is the beginning of the fever.

The state of sleep has been variously represented by writers upon it, whether physicians or metaphysicians. The effects of sleep in fever, and particularly in continued fever, are so great, that it may be necessary for the author to state his ideas on the subject.

Whence or how the powers of exertion, and the various operations, either of the body or mind, are produced, it is impossible to say: or at least every thing that has hitherto been said on the subject is visionary.

It has already been observed, that the power exerted by the muscles is not de-

rived from any mechanical or chemical construction or operation, but that it is an original power arising from the life of the animal. This power may be infinite, so that all the muscles may be able to exert themselves constantly with an infinite force; or it may be finite, and so that the muscles of the body may act altogether with a certain force, and constantly continue that force of action; or a certain number of muscles may exert all the force of the body, the others being at the same time necessarily at rest.

We find by experience that the force is not infinite, and that only a certain quantity of it can be exerted in a given time. It may be exerted either in all the muscles at once, or in a certain number of them, the remainder being at rest: for no man can lift above a certain weight, therefore the force is not infinite. A man cannot run with velocity, and strike at the same time an equal number of blows of equal force with a man keeping the muscles of his lower extremities at rest.

A man

A man might be able, either to exert his utmost muscular force constantly, or it might be necessary for him to come to rest, after having continued to exert his utmost muscular force a certain time, and to remain some time at rest before he could again exert it. The latter of which is known to be the case; that is, when a man has exhausted himself by labour, it is necessary that he should be recruited by rest.

The rest from muscular exertion is not, however, absolute rest; for there are some of the muscular exertions of the body which must always be carried on, in order that a man should live. It is necessary, for example, that the muscles of the organs of respiration should continue to expel vapours from the lungs, as they become unfit for the purposes of life, and draw in fresh vapours, otherwise the life would be lost; that the heart and arteries should be in constant action; that such muscular powers as form the tone of all the moving parts of the body should be constantly exerted, &c. The body
may

may be compared to a machine, moved by a stream of water always sufficient to keep some parts of the machine in action, but not the whole. If a dam be formed, leaving an outlet for part of the water sufficient to keep certain necessary parts of the machine in constant action, the remainder may be retained for a time, when on opening a sluice the water treasured up will set the whole machine in motion, and continue its action until the dam is emptied.

After a man has been at rest for a certain time, it is not necessary that he should exert the power he has re-acquired ; he may if he pleases continue in a certain degree at rest.

In fever, not only the body is affected, but often the mind also. It may, therefore, be necessary to make some investigation of the powers of the mind. It is, however, by no means intended to treat of the powers of the mind, or its properties, as they relate to diseases of the mind, but only in so far as they are connected with diseases of the body, particularly with fever.

The

The powers of the mind are, 1st. perception ; that is, the power of receiving impressions from the organs of sensation.

The organs of sensation are of a particular construction, by which some alteration is produced in them by external objects. The eye, for example, the organ whose operation is in this respect most evident, has a membrane in it called the retina, upon which the image of an external object is painted, by the lenses of the eye ; so far the body contributes to the idea formed in the mind by an external object, and so far the perception is in the body. Any thing in the body which prevents an object being painted on the retina, or painted with sufficient perfection on the retina, may be considered as a disease in the body preventing the perception of an external object. Supposing the object is perfectly painted upon the retina, yet, frequently, no impression is made upon the mind, and no idea whatever is excited. This may happen without any disease of the mind, merely from its attention being withdrawn to something else.

The

The tree in St. Paul's church-yard has been painted perfectly on the retina of millions of people, without exciting any idea in the mind, so much so as to be a common topic of jest books. This perception then must be considered as an operation of the mind entirely separate from the painting of the object on the retina.

The second operation of the mind is memory, the power of recalling ideas which have been formed by impressions made on some of the organs of sense, and it is certainly an operation of the mind alone.

Imagination, or the power of arranging ideas in various ways, has likewise been considered as purely an operation of the mind.

Lastly judgment, - or the power of determining whether ideas are properly arranged, and according to their original perception. The judgment, for example, would revolt, on having presented to it by the imagination a cow with an horse's head, or St. Paul's church placed in Pekin.

All

All these exertions of the mind are exertions of a certain power, but that power seems at first sight to be totally different from the muscular power of the body ; yet there is certainly this connection between them, that if the body has been fatigued with exercise, the mind cannot exert its powers of judgment, nor carry on any process by which it may determine the congruity of ideas. A student in mathematics, having once acquired the knowledge subservient to the demonstration of a problem, would not be able, after having contended in an athletic game, to trace the steps by which the problem was demonstrated.

On the other hand, a mathematician, after having gone through a new and laborious demonstration, would be unable to exert the powers of his body in a fox chase.

Whether, therefore, it be the same power employed in the exertions of the muscles and the mind, or different powers, yet these powers are so connected together, that the exertion of the one will prevent

vent the possibility of exerting the other in so great a degree as it might have been had there been no immediately previous exertion of either.

The powers of the mind, like the muscular power of the body, are not infinite. A man cannot perceive, remember, imagine, and judge of an infinite quantity of subjects at the same instant; he must indeed first perceive, then remember, then imagine, and then judge. Neither can the imagination arrange an infinite number of different ideas at the same instant, nor the judgment determine whether they are properly arranged, nor the memory bring up at once all the ideas it has in store, nor perception produce an infinite number of ideas at once. Hence it is evident, that the powers of the mind are no more infinite than the powers of the body.

The mind having exerted any one of its faculties for a certain length of time, can no more continue the exertion of that faculty, than a muscle, not necessary for
 I the

the immediate purposes of life, can continue its motion. This beyond a certain period renders it necessary, after the exertion of any of the faculties of the mind, that that faculty be allowed to rest some time before it is again exerted.

If the powers of the mind be exhausted by the exertion of any one faculty, no other faculty of the mind can be exerted till after rest.

In all these respects the force of the muscles, and the powers of the exertion of the mind, are perfectly similar to one another. There is one thing indeed which has been disputed by metaphysicians, whether there be any exertion of the mind absolutely necessary for its existence, as the respiration and the action of the heart are necessary for the existence of the body. It is not our present purpose to enquire into this; all that is to be said is, that we do not know, either *a priori*, or from experience, that is, from reflexion on the faculties of our own minds, that it is necessary that the mind should

should perceive, remember, arrange, or judge of any set of ideas in order to exist.

Upon the whole, therefore, in order to exert the powers of the body and the mind in their full force, it is necessary that there should be intervals of rest. The author conceives that sleep is this rest, sometimes more sometimes less perfect; for in sleep we shall, in the first place, consider the exertions of the mind. The judgment, which is the most exhausting operation of the mind, is totally at rest. Supposing even that the patient should dream, that is to say, that the memory should present certain ideas, and the imagination arrange them, the judgment never exerts its powers at all. The mind never revolts at a cow with an horse's head, nor the town of Pekin surrounding St. Paul's; nor whether St. Paul's is placed upon its base or turned topsy turvy, and reeling upon its cross. Imagination is left to go on freely in a dream without correction from the judgment. This is therefore certainly a great degree of rest of the greatest exertion of the mind. Although

though it frequently happens in sleep, that the memory and imagination are employed; or in other words, when a man dreams, it seems clear that they are at rest in a certain degree. If a man attends to what happens to him in a dream, he feels often that he has lost himself entirely, as if the memory produced no connected series of ideas, but flew from one object, and apparently from one period of time, to another; he is totally lost, and wonders that he has found himself again. That constant connexion of ideas, therefore, which takes place when a man is awake, does not exist in sleep. The memory, then, and the imagination do not exert themselves so much in sleep, and so constantly, as when a man is awake. Without entering into the controversy, whether the memory and imagination are ever totally at rest, the powers of perception in the mind are certainly, in many cases of sleep, totally at rest, without any defect in the organs or the exertions of the body. It is very true, as has been already observed, that the exertions of the body are often such as put parts of it in

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those

those situations in which the mind can take perceptions from it. The muscles of the eye for perception must exert themselves so, as to give the lenses the proper convexity to paint objects, which are at different distances, correctly on the retina. Therefore, should a man sleep in day-light with his eyes open, which has happened in a great number of cases, the mind could not receive perceptions, which are distinct, of objects which are at various distances. The lenses of the eye would certainly paint objects at a given distance very perfectly; but the mind would receive no idea from such painting. Therefore the mind, while a man is asleep, is at rest, so far as regards the power of perception.

Here then two exertions of the mind, in tolerably sound sleep, are entirely at rest; the power of receiving ideas from impressions from the body, and the power of judging whether the imagination has properly arranged the ideas that may be represented to it. There is certainly likewise a diminution of the powers of the memory, in presenting

senting ideas to the imagination, although perhaps not equally a diminution of the powers of the imagination in arranging such ideas, which, without the correction of the judgment, would arrange them, as the wind blows, as it listeth. There are perhaps too (as has been contended by some metaphysicians) cases in which the memory presents no ideas to the imagination, which of course can make no arrangement of them, so that the mind is perfectly at rest. In a certain degree of sleep, the mind perhaps neither receives any impression from any external object, nor has any ideas brought up into it, of course no ideas can be arranged; therefore arrangement cannot be judged of, or, in common expression, a man does not dream at all, according to some metaphysicians. This happens, we may say almost undoubtedly, in fainting fits, fits of epilepsy, hysteric fits, &c. where it was never known that any person, after coming out of them, ever remembered any dream at all. If in sleep, therefore, the mind is not at perfect rest, it is certainly at rest in a very great degree.

It has been already said, that the body cannot exert itself always, but must come to rest. The next enquiry, therefore, is, how far the body is at rest during sleep more than it is at any time while a man is awake. The first thing, in which the different states are to be compared, is the power of giving perceptions to the mind. The eye is that organ, in which the power of the body in giving perceptions to the mind has been most completely discovered, although perhaps not quite completely. It admits rays of light ; it collects them, and applies them to the retina, through transparent lenses, so as to paint there an image similar to the body, from which those rays of light were emitted. In sleep, then, the eye-lids are generally shut, so as to prevent the rays from falling upon the retina at all ; or at least the eye-lids are so opaque, as not to allow the rays to fall upon the retina, so as to paint any image at all ; therefore the power of perception in the body is, in this case, suspended and at rest. The author might say that, from analogy, the same thing probably happens in all the other organs

gans of the senses, and that they also are at rest; but he does not think that any truth can be deduced from analogy. It must depend only on future experience to determine, whether the sensibility, or power of impressing an idea on the mind by any of the other organs of sensation, is equally suspended in sleep as the power of the eye.

In tolerable sleep, therefore, the action of the body, which makes the impression on the mind, if not totally at rest, is much more at rest than when the body is awake.

When a man goes to sleep, as he does when not prevented by any external accident, he puts himself in a recumbent posture, which is not a posture he commonly assumes when awake. In this position, in the first place, he is supported by a great many more points than when standing, sitting, or walking; therefore more points being pressed upon, it requires less exertion to avoid the effects of such pressure. It is true, however, that the exertion might be equal, although it does not seem to the feel-

ing to be so. In the next place, if a man is in an erect posture, it requires the exertion of a great number of muscles to keep up the equilibrium necessary for that posture, while no such exertion is required in a recumbent posture, every part of the body throwing itself in that situation, in which its gravity would place it. So far, therefore, the body is more at rest when a man is asleep than when he is awake. Moreover it is well known, that what is habitual is performed with great ease; whereas going out of the habit requires a very considerable degree of exertion. Now the fœtus in the womb is laid with its body bent, its knees brought towards the chin, and its arms folded. A man in health rather lies, therefore, in this posture, which he has acquired by habit, than exert himself against that habit; so far again he is at rest in sleep. It is true that lying in this posture requires some muscular exertion, and so we see that those who have been reduced to a great degree of weakness lie, even when awake, upon their back, where there is hardly any muscular exertion at all. This,
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being contrary to their habit, produces a certain degree of uneasiness, which occasions an attempt to shift their posture, which being made by the muscles of the back, they are constantly throwing themselves towards the bottom of the bed. What has been just said shews that in sleep there is a great degree of rest from muscular action.

Again, the heat of the body is produced by the action of the living power. It is very true that almost every body, excepting Dr. Cullen, has attributed the heat of the body to some of the means of producing heat out of a living body: it would be a digression greatly too long to enter into at present, to state the arguments on this question here. If the opinion be wrong, that it does depend upon the living power, it will affect the present argument but very little, it being at present only intended to state a fact, to wit, that although the heat of the body to the thermometer be the same in a man sleeping or awake, yet when a man is asleep, he cannot communicate so much heat to the surrounding medium as when he

is awake. This is evident by the experience of every man, who falls asleep with the ordinary clothing which he wears when awake; waking again, he feels extremely cold; that is, he feels the substances that surround him very cold.

Although the heart continues its action when a man is asleep as well as awake, yet during sleep it happens very often that the pulse, the measure of the action of the heart, is neither so frequent, so full, nor so strong as when a man is awake. Moreover, the breathing does not go on so quickly, nor the peristaltic motion of the intestines in the same degree, nor any of the other actions necessary for life. Thus, although there is not a total rest in those actions of the body, which must constantly take place in order to its existence, yet the body does not exert itself in the same degree.

In sleep, therefore, the judgment is often totally at rest; perhaps the memory and imagination are sometimes also totally at rest; the power of perception in the mind is certainly sometimes totally at rest; the state of the
body,

body, which gives the mind a means of perception, is also in some instances, perhaps in all, totally at rest: the muscular exertions, not necessary for life, are totally at rest, excepting where habit has made it more easy for certain exertions to take place; and lastly, the muscular powers of the body, which are necessary for life, act with less vigour. Sleep, therefore, may be considered a state of rest, during which the powers of the system are recruited; or, to go on with the simile first begun with, the dam is shut up, so that the waters accumulate in it, and are ready to be applied, to bring the whole of the machine into action.

The only apparent objection to this view of sleep is, that people in madness, in many instances, never sleep; but then the author would contend that they are never awake. Their judgment, that which is the greatest exertion of the power of the system, is never at all exerted in maniacs who never sleep. The imagination may arrange the ideas that the memory presents to it, without the judgment ever attempting to disturb it.

it. The power of perception in their mind is undoubtedly perfectly confused; a crown of straw, or even a single straw, painted on the retina, excites the idea of a crown of gold adorned with jewels; a single straw the idea of a circle, and not of a line. The power of impressions on the body is much less; it requires several times the dose of a purgative, or of any other medicine, to produce an equivalent effect. The common stream of power flowing into the body, if we may so speak, may be sufficient to keep up such a degree of action, as has just been described, constantly, but not the actions which take place in a person whose faculties are sound.

The next thing to be inquired into is the effects of sleep.

Having shewn that the actions of the mind are very considerably at rest in sleep, if not sometimes totally, and that the exertions of the powers of the body are also in a great degree of inaction; if a quantity of living power be constantly generating in the system, it follows that in sleep this power will be gradually accumulated, as the
water

water would be in a dam, if a constant small stream were flowing into it, and only a part of that stream flowing out. The dam being filled, the water flowing over would set some of the parts of the machine at work, which might raise the sluices of the dam, and put the whole of the machine in motion. Thus in the system, when a quantity of power is accumulated, part of the exertions may take place, as we see is the case in natural sleep. A man in health, and not much fatigued, first falls into a reverie, and then into sleep, which at the beginning is accompanied with dreams, afterwards becomes more profound, until sometimes it becomes perfect, perhaps without any dream, and the person is with difficulty awaked and excited into action. After a time of such profound sleep, he begins again to dream; all his powers are brought into action with great facility if any stimulus be applied; otherwise they come into action, and the person awakes, without any stimulus being applied, as it were from the system being full of power.

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If the subject be viewed in this light, it will appear, that sleep is simply that rest, which is necessary to recruit the powers of the body and the mind, when they are exhausted; and that in the common and healthy state of the body, when there is the ordinary exertion, sleep is necessary, after a certain interval, to restore the powers of the system, so as to enable them to exert themselves.

Want of sleep, therefore, will prevent the necessary accumulation of the powers of the body, and consequently induce weakness, or the want of sufficient power in the system to exert itself to any great degree. A continual want of sleep, if the exertions take place, as when a man is awake, will at last, and does actually, so exhaust the system, as to deprive a man of all power of action whatever, so that he shall no longer exist.

Sometimes want of sleep for a certain length of time produces mania, a state of the system which it is not our business here to inquire into. It may be sufficient to observe,

observe, that we cannot pretend to determine *a priori* any thing with regard to what would happen to animals. Mania is a state of the system that no man could have imagined if it had never actually taken place.

Supposing the system is weakened by the want of sleep, and that mania does not take place, we are next to take notice of what happens, when the weakness is not so great as to destroy the patient.

If any machine be made on mechanical principles, so as at once to perform many actions independent of one another, and a force be applied to put that machine in motion, so that it shall perform all its functions; if that force be diminished, some of its functions may cease entirely, and the others go on regularly. Suppose that we had a time-piece, in which the motion of the parts keeping time should be produced or continued by any power, and that this power was more than sufficient to produce the motions keeping time. The superfluous
power

power may be employed to occasion another action, such as the pumping of water, to which it is actually applied. That machine might be so constructed, that the primary power shall be sufficient to keep up the motion of the time-piece and something more, but the power might be diminished so as not to be more than sufficient: in that case it would cease to act upon the pump, so that the motion of the time-keeper might continue, without the motion of the pump. Or otherwise, a mechanical machine might be so contrived, as that the power originally generating motion should act equally in producing all its motions; in that case, if the original power was diminished, all its motions would be diminished equally. Neither of these is the case in the human body, when the power which actuates it is diminished for want of sleep, or by any other means. Some of its actions do not cease while others go on, nor are they all equally diminished; but the whole of its actions become irregular. While some of them diminish, others increase, indiscriminately; that is, it is uncertain which will increase and which diminish. Want of sleep,

sleep, therefore, produces irregularity in the whole actions of the body, and great irregularity in fever. So does also any other cause diminishing the powers of the body, but not nearly so much as want of sleep.

For example, if a man in health should be prevented from sleeping during a whole night, little more would happen, than that all the powers of the body and mind would be somewhat diminished. He would not be able to make such great exertions in walking and riding; nor would he exert the muscular actions of the interior parts of the body in so great a degree. The powers of his perception, as far as depended on the body, would not be so complete. For example, he would not be able to adapt his eye so exactly to the distance of an object, as that it should be painted perfectly on the retina; the mind would take less readily or perfectly the impression from the object painted on the retina; the memory would be less ready in bringing up ideas to the imagination; the imagination

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would

would be less ready to arrange them, and the judgment would be much less exerted in determining the justness of that arrangement.

In so far the system would be affected pretty nearly in the same manner as a mechanical machine which had lost part of its power.

Let the same man be prevented from sleeping a second night, then irregularity would begin to take place through the system. A strong contraction would begin to take place in some of the muscular fibres of the intestines; the appetite would begin to be lost; the muscles in the exterior parts of the body would some of them act more strongly, others more weakly; the heart would sometimes contract more frequently, sometimes, although seldom, more slowly; the powers of perception, as far as depended on the body, would some of them be stronger for a short time, and soon after in the same organ weaker; the same thing would happen in the power of perception, as far as
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it depended on the mind ; memory would sometimes bring up ideas very fast, and sometimes very slowly ; the imagination would sometimes arrange ideas very readily, but not very often in the order which the judgment would approve of, and the judgment in many cases would not be exerted at all, but leave the fancy to arrange them just as it pleased ; and if a man in health continued to be prevented from sleeping, these derangements would go on and mania would often be produced.

On the other hand, if such derangements as have been described should take place from any other cause in a man in health, sleep would be prevented.

In fever, as well as in many other diseases, these disorders in the system prevent sleep in a much greater degree ; and want of sleep produces them also in a much greater degree, only instead of mania delirium takes place.

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While the disorders in the system which take place in fevers prevent sleep, the want of sleep in fevers weakens the whole system, produces the disorders which have been enumerated, and occasions delirium.

To return from this digression ; when a continued fever is produced, sometimes, when the cause of the disease is applied, there is not the least appearance of fever, or any apparent alteration from health for many days, until all at once a complete paroxysm of fever comes on. Sometimes, when the cause of fever is applied, some slight febrile appearances take place, and continue till a perfect attack of fever arises, which comes on at once, and its first paroxysm is easily ascertained ; now and then they gradually diminish and go off, without any permanent fever arising. When such slighter febrile symptoms take place, they do not increase gradually, so as to constitute a fever, but the patient goes on with his ordinary occupations ; not well indeed, but not so as to be confined,

until all at once a paroxysm, such as has been described in the dissertation on the *ephemera simplex*, takes place, so that the patient can almost always mark the very hour in which the attack comes on. Sometimes a complete paroxysm of fever is produced immediately on application of the cause.

If none of the symptoms of fever happen between the time of the application of the cause and that of the first paroxysm, a strong attack takes place at once, and begins often with a sense of coldness, horror and rigour; the cold is followed by a sensation of heat, which is succeeded again by a sense of coldness, and so alternately for the first twenty-four hours. Sometimes there is no sense of coldness, but the patient feels from the beginning very hot. Whether there be a sense of coldness or a sense of heat, the thermometer under the tongue rises to about one hundred, or from that to one hundred and five degrees of Fahrenheit's scale, excepting at the very first beginning of the attack. Whether there be sense of cold or of heat,

there is always great depression of strength, both in the powers of the body and the mind, which is generally according to the degree of fever, sometimes so great as to render the patient unable to support himself in an erect posture; sometimes not so considerable as to prevent him from doing his ordinary business, if he makes extraordinary exertions.

It has unluckily often happened, that physicians have been too apt to go on attending their patients for a day or two after a paroxysm has actually taken place, and unfortunately have been by that means so exhausted, as not to be able to go through the remaining part of the disease, but have been cut off.

The depression of strength is, in all degrees, between these extremes. The pulse, during the first twenty-four hours, beats seldom less than ninety times in a minute, and very seldom more than one hundred and five in a minute; whereas in an ephemera, or in the first paroxysm of an intermittent, it very often rises to one hundred and

and twenty or thirty pulsations. It is sometimes full and strong, always obstructed, sometimes small and particularly soft, sometimes of the natural fulness, but with a particular degree of softness; when this is the case, it indicates a fever which will be very violent, especially in respect to the depression of strength.

The author wishes in this place to explain his terms with regard to strength, hardness, softness, obstruction, or freedom of the pulse.

Great numbers of practitioners have called obstruction hardness, freedom softness of the pulse.

The feelings of the organs of the senses are often different in different men. The ear, for example, of one person, can distinguish accurately the different notes on the musical scale; the ear of another can distinguish nothing but that the sound is louder or less loud. In like manner, the fingers of some are only capable of distinguishing whether the pulse is more or less frequent, and that

by comparing it with some other measure of time. It is necessary, therefore, that we should have some other criterion of the differences of pulsation than the feel of the practitioner, in order to be able to teach young practitioners how to discover if they have any power of feeling different sensations, and distinguishing them.

When the pulse is hard, whether it be strong or not, the blood is long in coagulating; the consequence of which is, that if the blood flow from a vein in a large stream through the air, into a vessel nearly the section of a sphere, the red particles will fall down towards the bottom of the blood, and leave the upper surface of the coagulum colourless after the blood has coagulated: whereas if the pulse be strong, without any hardness, the blood will coagulate much sooner under the same circumstances, so as not to give time for the red particles to fall down from the upper surface of the coagulum, which will therefore be red.

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In like manner, if the pulse be obstructed and not hard, the coagulum will be red on the upper surface.

This then is a criterion by which strength and obstruction may be distinguished from hardness, viz. when the pulse is hard, the upper surface of the coagulum is not red.

It is necessary that the practitioner should make himself master of the feel of the pulsation under these different circumstances. This may be done by feeling the pulse of a patient affected with an intermittent, in which there is often strength, fulness and obstruction, but no hardness, and in which case a quantity of blood may be taken away without any detriment to the patient; and again, in a pleurisy, where there is strength and hardness, and in which blood is taken away with great propriety.

By these means any man with the faculty of feeling, so as to distinguish the different

sensations arising from pulsations, may make himself master of the difference between hardness and strength, or obstruction, which, as will be shewn afterwards, is very essential in the management of fever, obstruction being an essential symptom of fever. Hardness is an irregularity, and consequently is to be referred to that treatise, in which irregular fevers are to be considered.

In the same manner, when upon the application of the cause of fever some slight symptoms of fever take place, and continue some time, whatever were the previous symptoms, on the attack of the fever, coldness suddenly takes place, followed by heat; or otherwise, a much greater degree of sense of heat arises suddenly, with a much greater depression of strength and a similar pulsation of the arteries, &c.

Along with these symptoms, there is generally pain in the forehead, and all the other appearances which arise in an ephemera, or the first paroxysm of an intermittent, and have
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been enumerated in the dissertations on those subjects. They proceed in the same manner, excepting that they are much more irregular in the first paroxysm of a continued fever, than they are in an ephemera or an intermittent, where the first paroxysm of an intermittent is terminated by a crisis. The sense of coldness and heat return alternately, without any regular duration of either. This happens especially when the fever is severe. The depression of strength is likewise greater or less at different times; thus there is an irregularity during the whole of the first paroxysm.

It has been a question much agitated by authors, whether fevers lasting for many days consist of one paroxysm, or of many paroxysms following each other, as happens in intermittents.

It has been observed, in the dissertation on a regular tertian, that for the first days there was no crisis in many cases, but the disease, as it went on, shewed more and more critical symptoms, until a very evident,
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or, at last, a complete crisis took place, and the disease terminated in an intermittent. In continued fevers the appearances are such as take place at the beginning of intermittents, where there is at first no intermission; the paroxysm does not terminate in a crisis, but there is some relaxation, after which a fresh paroxysm takes place. This may be considered as an argument, that a continued fever is only a variety of an intermittent. The Author of the world has laid the distinctions between different things so as to run into one another by shades. How much soever, for example, a man may differ from wheat, yet nevertheless it is difficult to determine whether a sponge be an animal or vegetable substance; things, therefore, being shaded into each other, by no means prove them to be the same. It requires, therefore, that we should be extremely circumspect in determining that a continued fever is essentially the same disease with an intermittent and an ephemera.

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There is similarity of all the appearances in the three diseases, excepting that one crisis often happens in a continued fever, and entirely carries off the disease, which takes place likewise in the ephemera; although sometimes no crisis takes place in a continued fever, this happens neither in an intermittent nor in an ephemera. This similarity has determined practitioners of the greatest eminence through the whole history of medicine to consider them as the same disease. Many have thought they varied, in this circumstance, that in a continued fever the subsequent paroxysm takes place in the hot fit of the prior paroxysm. In an ephemera no subsequent paroxysm takes place. In an intermittent, the subsequent paroxysms happen in the crisis, or after the crisis of the former.

A question arises, how long the first paroxysm of a continued fever lasts, before the second paroxysm begins.

The author has seen it happen, in a few cases of an ephemera, that the disease has continued thirty-six hours, and in one case
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above forty hours from the attack to the termination of the crisis, but this very rarely.

The first attack of a fever begins more frequently by much, as has been observed in a former dissertation, between six o'clock in the morning and eight in the evening. In a continued fever, if the attack should be between six o'clock in the morning and eight in the evening of one day, a fresh exacerbation or sudden increase of the disease takes place, between five and six in the evening of the succeeding day.

It has been said, that sometimes a paroxysm of fever takes place as soon as the cause is applied; likewise that fever takes place at least ten times between six in the morning and eight in the evening for once in the remaining part of the twenty-four hours. This might be accounted for, from a man being exposed to the causes of fever much oftener in the day-time than during the night, when the attack follows the cause immediately. When some slight symptoms only of the disease take place at the time of the application of the causes, and when no appearances occur for
many

many days after the application of the first cause; if in either of these cases the first paroxysm begins between six in the morning and eight in the evening, the author has nothing to offer to account for this phenomenon. That it is a fact he is well assured, from the observation he has made for many years in cases of a great many patients.

If it be true that a continued fever is only paroxysms of fever running into one another, it becomes a question how long these paroxysms last, and what is the cause of their return. In the first place, so far as the author's observation has gone, the first paroxysm of continued fever lasts, if it begins at six in the 'morning, or at any other hour before eight the evening, until five and six in the evening of the following civil day. That is, if it should happen at any time between six o'clock in the morning and eight o'clock in the evening, the second exacerbation will begin at six o'clock nearly of the subsequent civil day. But if the first paroxysm should take place between eight o'clock in the evening and five o'clock

in the morning, then the second exacerbation will take place in the evening of the subsequent day, if it should be before midnight; on the same day, if it should be after midnight.

In other words, supposing that the first paroxysm of fever should take place at six o'clock on Sunday morning, or at any time between that and six o'clock on Monday morning, the second paroxysm will take place between five and six on Monday evening.

The next thing to be attended to, is the reason why this second exacerbation, or new paroxysm of fever, should take place between five and six o'clock in the evening.

It has been before remarked, that all men, even in the most perfect health, have a feverish attack in the evening, which goes off in the morning. In a man in perfect health this attack, although not much marked, is yet sufficiently sensible. In the first place, there is a depression of strength,
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both in the body and the mind, sufficiently evident. There is not the same alacrity of mind in the evening, nor power of memory, imagination, and judgment, as there is in the morning. This proposition has been controverted by poets and philosophers, who have often praised midnight study. Two things might be objected to them; first, they are not willing to give up their connexions with the world for the sake of study; and therefore defer it until every body else is at rest. Secondly, there is that indolence in mankind, especially in those who consider speculation as their supreme happiness, which makes them wish to defer every thing to the last moment.

It is easy, however, to refer the fact to the feeling, or in other words, to the experience of all mankind; the alacrity of the mind in the morning, and its dulness in the evening, have the one been celebrated by poets and philosophers, and the other reprobated.

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The muscular power of the body is likewise greater in the morning: labourers, whatever may be their habits, universally get up in the morning to their work, and go soon to bed: hunters rise early in pursuit of their game in every situation; even where the scent of the game lies better on the ground, as where a wood is enclosed, in which it is equal at any time of the twenty-four hours.

Some of the appearances which constitute part of fever, such as the contraction of the small vessels, are evidently much greater in the evening. The complexion of a woman is pale in the evening, that was rosy in the morning.

If in perfect health this natural evening paroxysm of fever is visible, it is infinitely more so in diseases of most kinds, there being none in which it has not been observed by practitioners; so much so, that it is not necessary for any further illustration of it to be laid down here,

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The cause of this natural evening paroxysm of fever has not as yet been investigated. It cannot depend upon the sun, it happens at a time of day when he is at no particular meridian; much less can it depend upon the moon, it is fixed to a particular time in the evening, whereas her appearance is perfectly mutable. It might be supposed to depend upon the fatigue of the day, but it happens equally to the labourer who goes to the plough at four o'clock in the morning, and to bed at eight in the evening, and to a woman who goes to bed at four in the morning, and rises at two in the afternoon.

It may be said, that it depends on habit; as infants, until they come to a certain age, are put to bed early in the evening, and rise early in the morning. This reason is refuted by the following circumstance: the sun rises at different times at different parts of the earth, so that it is at one part of the earth morning, when in another part of the earth it is evening. If a man, brought up in one part of the earth,

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where it is morning, when it is evening in another part, should pass from his native country to the country in which his former morning is evening, if it were habit, the natural evening paroxysm of fever ought to take place in him in the morning; but the fact is, that it takes place in the evening, in the same manner as in the natives of that country.

No method has, therefore, hitherto been found out, to account for this appearance.

Whatever be the cause of the return of a paroxysm of fever in the evening, even in health, it is evident that this propensity is the cause of the return of the second paroxysm in a continued fever.

It has been said, that if a fever takes place any time between five and six o'clock in the morning of one civil day, and five and six in the morning of the second day, the second paroxysm takes place between five and six o'clock in the evening of the second day. It sometimes happens, however,
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that no second paroxysm takes place between five and six in the evening of the second day; in this case, the fever wears off, and is an ephamera; such cases, however, rarely happen. The author has indeed had occasion to observe them four or five times in his practice. As far as can be judged, therefore, it is the disposition to natural evening paroxysm of fever, that reproduces the paroxysms of continued fevers.

The causes then which reproduce fever are apparently two, one that reproduces a remittent and intermittent fever at the expiration of a certain period of time; the other the natural evening paroxysm, which reproduces a continued fever; both of which, as far as the science of medicine has hitherto been investigated, are perfectly incomprehensible.

It is to be remarked in the first place, that these different causes serve to distinguish between an intermittent and remittent on one hand, and a continued fever on the other hand. For if we find, in the first days of a fever, when there is no perfect inter-

mission, that the exacerbation takes place between five and six o'clock in the evening, or a little later, we may conclude, that the disease is a continued fever; but if the exacerbations take place at any other time in the twenty-four hours, that it will terminate in an intermittent or remittent fever.

The next circumstance, that depends upon this doctrine, is the time of the beginning of a continued fever.

There has been much said about the days of a fever; it is clearly impossible to determine the day, unless we can tell on what day the fever began. If in continued fever, the second exacerbation always takes place between five and six o'clock in the evening; the third paroxysm, and the fourth, fifth, &c. also begin between five and six o'clock in the evening; the first must be conceived to begin between five and six o'clock in the evening, whatever time it really took place, according to the rule already laid down, by which it has been shewn

shewn at what time the second paroxysm actually takes place, the first being considered as beginning 24 hours sooner.

It has been already said, that the first paroxysm of a continued fever is irregular, with a greater or less degree of violence, seldom, however, so violent as the subsequent paroxysm.

The second paroxysm is generally regular; it rarely begins with a sense of coldness; the head-ach is considerably increased; the pulse is from ninety strokes in a minute to an hundred and ten, seldom more frequent, excepting when the disease is to be an irregular continued fever, which is to be the subject of a future dissertation; it is always obstructed, not often hard; when it is hard, this likewise indicates irregular fever, which will also be the subject of a future dissertation; lastly, it is of different degrees of fulness and strength. Depression of strength is undoubtedly an universal and constant symptom of fever, and therefore cannot be considered as an irregularity; the degree, however, of depression of strength, is very

various ; when it is very great, the pulse has a very peculiar feel of softness.

The heat taken by the thermometer under the tongue, is from ninety-nine to one hundred and five of Fahrenheit's thermometer ; to the feel of the patient, it is generally greater, sometimes excessive ; to another person, always more or less pungent. The appetite is likewise lost to a greater or less degree, according to the violence of the disease, often totally : there is always some degree of nausea, often sickness, and sometimes vomiting. Thirst is sometimes very great, sometimes inconsiderable, or hardly felt. The evacuations are generally suppressed ; the patient is costive ; the skin dry ; the urine is in small quantity, and after standing some time, continues transparent ; the mouth is dry. The mind is always more or less confused ; sometimes even so early as in the second paroxysm, the patient is delirious during the whole night ; sometimes again the sleep is only confused with dreams. The tongue, which in the first paroxysm was only covered all over with a very thin whitish crust, is now generally

generally become browner; if the fever is more severe, this crust is thicker: when the depression of strength is great, it is clammy. There is a sense of weight about the precordia, likewise a sense of depression and anxiety.

The author has hesitated much whether he should describe a fever, in which the strength is very much depressed, as an irregular fever. After mature deliberation, however, he can hardly allow himself to distinguish it as such. It is true, Sir John Pringle, and many other practitioners, being attracted by the appearance of putrefaction which takes place in fevers where the strength is greatly depressed, have supposed that the disease depends on putrefaction of the fluids, and not the putrefaction of the fluids upon the disease. If the putrefaction of the fluids is subsequent to the depression of strength, and if a certain degree of depression of strength takes place in all fevers, in that case certainly the putrefaction of the fluids cannot be considered either as the effect of putrefaction, or

as an accident happening in fevers. This argument will be more fully entered into afterwards; it is therefore only to be remarked now, that according to the degree of depression of strength, a greater or less weight is felt about the precordia: sometimes depression of the mind, as if some great misfortune had happened to the patient, which he cannot describe, and sighs arise involuntary from his breast.

The degree of depression of strength generally determines the wish to be in bed; where, as has already been observed, the muscles have the least exertion. When it is not very great, however, and when the patient is naturally spirited, he wishes to get up in the day-time, but is generally forced to lie down several times in the course of the day. The skin appears of a dusky dingy colour, the ground of which has been already explained in a former dissertation.

There is pain in the forehead, immediately over the eyes, which feels to the patient in the skin, or immediately below
it,

it. This pain is sometimes slight, sometimes very severe; sometimes reaches all round the head, but is always external, to the feel of the patient.

Sometimes there is depression of strength only in the extremities, and a feel of weariness. At other times there is a feel of soreness, as if the patient had been beat all over, or such as arises after a very strong contraction of any muscle. This last symptom takes place only when the fever is very severe. All these appearances come on, or are increased, between five and six o'clock in the evening; increase gradually, and are at their greatest height about two or three o'clock in the morning. Afterwards, in slighter cases, the patient has some tolerable sleep; it is a very severe fever indeed in which he has none; but even then he is less restless, and is relieved in a greater or less degree from all the symptoms about five or six o'clock in the morning. Although all the appearances that have been enumerated remain, yet they remain with less severity than

than they were felt about two o'clock in the morning.

The third paroxysm is more severe than the second, and so every evening the disease continues to increase for the first week.

The author has already ventured to hint an opinion, that the putrefaction of the fluids, which sometimes takes place in fever, is the consequence of the depression of strength, and not the cause of it. The contrary opinion has been held by Sir John Pringle, and many other of the first authorities in medicine, and therefore requires very particular attention.

It has pleased the Almighty, that animals and vegetables should be continued by succession. The present race of both die, some in a shorter, some in a longer period of time; but all die at last, and are succeeded by their progeny, each species producing successors perfectly, or nearly similar in properties to itself.

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When one race dies, it is evident that some means should be adapted to destroy the matter of which it consisted. A new race of vegetables, would have no room on the earth, if the old vegetables remained exactly in the same situation in which they died; a tree would soon be buried in its own leaves; even animals would soon cover the whole face of the earth, so as not to give room to new animals, without constantly treading over the bodies of their ancestors; the sea would become one mass of dead fish.

The all-wise Creator of all beings has, therefore, found means, with perfect facility, to get rid of this, as well as every other difficulty, that the small degree of discernment of mankind has been able to perceive in the creation. There are two modes in which this is performed, as far as the subject has been investigated. One is by creating many insects and reptiles, which live upon dead matter; these are much more numerous in the warmer regions of the earth, where both vegetation and the growth of animals go on with greater rapidity. How soon do the
termites

termites destroy in a warm climate all dead vegetable matter !

The other mode is by making animal and vegetable substances subject to processes, which are called fermentations, the ground of which the author has endeavoured to set forth in his Treatise on Digestion, which fermentations terminate in putrefaction. It would be improper here to say any thing further of this process, than that it converts all animal and vegetable matter into certain salts, into vapours in a small proportion, but principally into earth and water.

It has been observed, in recounting the causes of fever, that one cause was the vapour arising from putrefying substances.

If to dead animal matter a putrefying substance, or vapour arising from a putrefying substance be applied, putrefaction will take place in it much more readily than in a dead animal or vegetable substance to which no putrefying substance has been applied. A question therefore arises, whether a putrefying

fyng substance, or the vapour arising from a putrefying substance, applied to living animal matter, will produce putrefaction sooner than if no such substance or vapour were applied.

It has been already shewn, that it is necessary that dead animal and vegetable substances should be destroyed; it has also been said, that it has pleased the Almighty, that all living animals and vegetables should die.

The manner in which all living animal and vegetable substances are to die, and so be lost, is very different, however, from the mode in which animal and vegetable matter when dead, is to be destroyed.

A living animal, or vegetable, is produced by its parent, weak at first and imperfect; it acquires perfection by degrees, until it becomes capable of all the purposes for which it is destined. Among these purposes, one is, to be capable of propagating its species; and for this, after some time, it has

less and less power; at last its faculties begin to decay, and gradually decay until the whole of them are lost, and the animal or vegetable dies. In man this progress is more marked than in any other part of the creation.

In this manner man is to live through his life and die, but during his life he is not subject to the laws of dead animal and vegetable matter; among these, therefore, not subject to putrefaction. If man, when alive, were subject to the laws of putrefaction, why should he be placed in every situation in which putrefaction most readily takes place?

Putrefaction takes place most readily in a heat of one hundred degrees of Fahrenheit's thermometer: it goes on much more slowly in a heat of one hundred and ten; hardly in animal substances in the heat of one hundred and fifty; it goes on more slowly in less degrees of heat than one hundred, and scarcely at all in forty degrees of Fahrenheit's thermometer.

The heat of the human body, in health and vigour, is generally ninety-seven degrees
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and an half of Fahrenheit's thermometer. It varies in disease, sometimes from ninety-two to one hundred and seven. It is always therefore, both in health and disease, near the most proper heat for putrefaction, yet no appearances of putrefaction take place in the blood, nor in any part which is alive, excepting in fever and sea-scurvy.

Another circumstance which forwards putrefaction is exposure to pure air. If an animal substance, the moment it dies, is perfectly excluded from pure air, it will not putrefy; on the other hand, if a great blast of pure air be constantly applied to it, it will putrefy much more slowly than if a moderate quantity be applied. The application of a moderate quantity, therefore, is the best means of producing putrefaction; a moderate quantity of pure air is actually applied to the matter of the body of a living man. The vapours constituting the atmosphere contain a fourth part of pure air, are applied only to the surfaces of the body, that is, to the skin; the surface of the nostrils, mouth, and lungs, which form a
very

very small part of the solids ; and the pure air of the atmosphere has a moderate effect on the blood passing through the lungs. That it does affect it in a certain degree appears from its giving a yellow colour to the red blood, so as to render it scarlet. As far, therefore, as application of air tends to produce putrefaction, the human body is in that situation, in which putrefaction would most readily take place.

Another circumstance under which the putrefactive fermentation takes place more readily is motion. In the human body the fluids are in constant and very rapid motion: the heart contracts seventy-three times in a minute. It has been supposed, that as near as can be measured, it sends out at each contraction two ounces of blood in a minute ; supposing then that the blood is in the largest quantity that has ever been stated, to wit, sixty pounds, the whole of it will be circulated through all the canals in the body, and return to the heart, in six minutes.

To

To give a more distinct idea of the velocity with which the blood moves in the veins, where it moves with the least velocity, let a man compress a vein on the back of his hand at some distance from the valve, immediately above, and squeeze out the blood up to the next valve, so that the vein shall disappear ; then let him immediately remove the pressure, he will find the vein fill again faster than his eye can trace. The blood, therefore, has always constant and rapid motion.

It is evident, therefore, that the matter of the living human body is always in circumstances, in which dead animal matter would putrefy most readily.

It has been alledged, that certain salts, or other matters, contained in the blood, and other parts of a living man, prevent the other matter in his body from putrefying, or that the putrescent matters were carried off, and fresh matter introduced, so as to pre-

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vent putrefaction from taking place. Those who have advanced the former part of this doctrine have forgotten, that if the body of a dead man is left in the heat of ninety-seven and a half degrees of Fahrenheit's thermometer, without motion and application of the air to the blood or the lungs, although the same salts, or other substances remain exactly, putrefaction takes place in twenty-four hours in a very violent degree.

Against the opinion of some authors, that matter is constantly carried off, and new matter introduced, and by that means the putrefaction prevented, the following argument is sufficient. It is well known, that a man may live under all the necessary and most powerful circumstances of putrefaction, without any thing being taken in for twenty-four hours, or evacuated, excepting the water that flies off by insensible perspiration; yet there is not the smallest appearance of putrefaction in the body. If, however, a man had been destroyed instantly, when in perfect health, by some accident, such as a wound in the spinal marrow, between the first and
second

second vertebræ of the neck; putrefaction would take place in that space of time, if the temperature of the dead body was confined to ninety-seven degrees and an half of Fahrenheit's thermometer, although it was not assisted by exposure to the air in respiration, or by motion.

Since, therefore, it is known, that although the body of a living man be in every situation most proper for putrefaction, and nothing is applied which would prevent the same body, if it was dead, from putrefying, nevertheless the body of a living man has no appearance of putrefaction; it necessarily follows that there is in the life, independent of all other circumstances, a power of preventing putrefaction. In other words, it is the property of living matter to remain untainted by putrefaction; the property of dead animal and vegetable matter to putrefy.

Mankind, ever inquisitive, from the disposition which the Almighty has chosen to place in their minds, are constantly en-

deavouring to find reasons for every effect happening according to something they are already acquainted with. In this particular case they have supposed, that the operations which take place in living animal matter should agree chymically with operations that they can perform in dead animal matter. They have, therefore, concluded, that since animal matter, when alive, is prevented from putrefying in certain circumstances in which it would have putrefied very readily when dead, this must be occasioned by means which would have prevented dead animal matter from putrefying, if it had been in the same circumstances. No such means, however, have been shewn to be applied to living animal matter.

Was it not as easy for the Almighty to make a law, that living animal matter should not putrefy, and that dead animal matter should putrefy, as to make a law that if one mass of matter be placed at a distance from another mass, the two should immediately, if not prevented by some cause, begin to approach each other.

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The author by no means wishes it to be understood, that it is unnecessary to enquire, whether it be or be not so; that must be investigated by experiments and observations. He has shewn that every circumstance which would make putrefaction take place in the dead body of a man, is constantly applied in the living body; and that no chymical circumstance has been discovered in the body of a living man, to prevent such putrefaction from taking place. He therefore concludes, that it is an original law given by the Creator, that living matter should not putrefy, and that dead animal or vegetable matter should putrefy and be destroyed.

The heat of living animal and vegetable substances will admit of a parity of reasoning; but this is foreign to the present subject.

Thus far the author has enquired, whether the human body, when alive, has a power of resisting putrefaction when exposed to all the

circumstances which promote putrefaction in a dead human body.

The point that the author set out with was, whether putrescent matter, applied to the body, produced a fever, and in that fever depression of strength, which occasioned putrefaction; or if the putrid matter applied to the body occasioned putrefaction of the fluids, as a ferment or otherwise, and that putrefaction brought on a depression of strength.

Many people are constantly exposed to putrid matter, both in a solid and fluid state; as also to the vapours arising from putrid substances, and yet no putrefaction, or any appearance of putrefaction, is found in their blood: those, for example, who are employed in cleaning out putrid ditches, or the common sewers of great towns, in their blood, or in any other part of their body, no appearance of putrefaction is ever perceived.

Unless,

Unless, therefore, a fever is produced, and depression of strength as part of that fever, it is evident that putrid matter does not occasion any appearance of putrefaction.

When a fever is produced by putrid vapour, or any other cause, if the fever be in a great degree, there is great depression of strength at the first; but for several days there is no appearance whatever of any putrefaction in the fluids. Blood taken from the arm coagulates firmly; the tongue is covered with a whitish crust; there is no putrid smell in the air from the lungs, nor in any of the other evacuations; there are no marks upon the skin; there is no appearance of putrefaction in short in any parts of the body; but besides the great feel of depression of bodily strength, there is great depression of spirits, and sense of weight about the precordia, with a peculiar imbecility in the pulse.

As therefore the depression of strength takes place first, and the putrefaction afterwards, according to the usual precedence

of cause and effect, to wit, that the effect follows the cause, it seems to be sufficiently proved, that depression of strength is the cause of the putrefaction, and not the putrefaction the cause of the depression of strength.

In sea scurvy, as it is called, the putrefaction of the fluids arises undoubtedly from animal food being used without a sufficient quantity of vegetables of a loose texture, to prevent it from entering in part into the putrefactive fermentation during the digestion. This happens especially when the animal food is preserved by salt. In such cases a chyle is thrown into the blood-vessels loaded with putrescent matter. In this disease the first symptoms which take place are always languor and depression of strength, and inability of exerting the muscular powers. Afterwards symptoms of putrefaction come on. This shews that even in this case it is the depression of strength that occasions the putrefaction.

Since,

Since, therefore, the solids and fluids of a living man are placed in situations the most proper for putrefaction ;

Since there is nothing applied to the living body to prevent putrefaction, which is not also applied to the dead body when it putrefies very fast ;

Since no fresh matter is added to the living body during the time in which the dead body, placed in the same circumstances, would putrefy.

Since the depression of strength takes place always in a fever before there be any appearances of putrefaction ;

And lastly, since when the blood is rendered putrid by putrescent matter being thrown into it, depression of strength always takes place before there be any appearance of putrefaction ;

It may be concluded, that the depression of strength is the cause of the putrefaction
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of the fluids in fever, and not the putrefaction of the fluids the cause of the depression of strength,

Symptoms of putrefaction rarely appear in the second paroxysm of a continued fever; seldom in the third paroxysm, or third day of the disease, counting as has been already laid down.

The symptoms of putrefaction, when they first take place, are alterations in the appearance of the secretions. The urine first has a more viscid appearance than common; is frothy, browner, and not absolutely transparent, although there is no cloud or sediment. If the putrefaction is still greater, it becomes of a dark brown, and loses its transparency, and sometimes a dark brown sediment falls to the bottom of the vessel, after it has stood an hour or two. The fæces begin to be foetid, and at last have a very putrid foetor, which, however, is to be distinguished from the foetor of the inflammable air, which is often discharged and is very foetid, although there be no putrefaction. The
fæces

foeces are also not uncommonly black and liquid. The sweat, if there should be any, tinges the linen with a dilute ichorous appearance. The crust which forms upon the tongue appears browner and more clammy; as the fever goes on it grows browner and browner, until at last it is quite black; the teeth, rubbing it off from the tongue, become as it were buried in a black slime; this hardly takes place before the end of the first week of the disease; the breath also becomes foetid.

There sometimes appears upon the skin, but not excepting the putrefaction has arisen to a considerable degree, a kind of discolouration, similar to the appearances which we find in polished marble, not purely white, which are called bluish veins. When the degree of putrefaction is more considerable, dark purple spots, of various sizes, are formed in the skin; if the putrefaction be still more considerable, the skin becomes all over of a dark purple colour.

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At the beginning, when the putrefaction has not gone to any great length, if blood should happen to have been taken from the arm, the coagulum is loose and easily broken, the serum being hardly of a browner colour than common. Sometimes when the depression of strength is not very great, the blood retains this appearance during the whole course of the disease. Should the patient become so weak, as to be carried off by the weakness, this appearance is not altered, for it is depression of strength, not weakness, which produces putrefaction.

If there is greater depression of strength, and by consequence putrefaction is in a greater degree, the serum becomes of a browner colour. In a still further degree, it is red: in this case, on examining the red particles with a microscope, many of them are found diminished in size, and not regular spheres, or oblate spheroids; some have the appearance of being broken in two, and look like half moons: but most of them retain their healthy appearance. If the putrefaction goes on still further, there is hardly
any

any distinction between serum and coagulum; if still further, the coagulable lymph forms a kind of bag, leaving the serum on the outside distinct. In the substance of the bag itself there is no intermixture of red particles, so that it looks like the buff, which is on the surface of the coagulum in cases of general inflammation; but within this bag a red fluid is contained, which, upon being examined with a microscope, shews the red particles of a variety of forms.

All these appearances the author has seen. There are some cases upon record in which it is stated, that the blood was absolutely fetid; and a practitioner of perfect credit, who practised a considerable time in hot climates, told me he had seen several cases, where the blood taken from the arm was actually fetid.

As depression of strength produces putrefaction of the fluids, so, on the other hand, putrefaction of the fluids occasions greater depression of strength, sometimes in a degree that proves fatal: in this case the
pulse

pulse often towards the end beats faster than can be counted.

It happens more frequently that hemorrhage arises, almost indiscriminately, from any of the cavities which open externally: these hemorrhages are very dangerous, and often fatal.

Depression of strength happens in a greater or less degree in all fevers; in many it does not happen in such a degree as to produce any sensible appearance of putrefaction of the blood; yet as the cases in which it does produce putrefaction of the blood, and those in which it does not produce any appearance of putrefaction of it, only differ in degree, it can never form an irregularity of fever; it can only give rise to a variety, which does not at all affect the practice, as will be afterwards shewn.

At particular times it is very rare that any great mark of putrefaction takes place; at other times it is more frequent. It

was common enough in London from one thousand seven hundred and fifty, to one thousand seven hundred and sixty-five; from that time the severer symptoms of putrefaction have been seldomer seen; and from one thousand seven hundred and seventy-five to this period, one thousand seven hundred and ninety-seven, they have been very rarely seen indeed in fevers.

Among the symptoms of the disease, which gradually increase from the second exacerbation to the end of the first week, or sometimes a little longer, is delirium, which will likewise require a more minute investigation.

In the first place, it is necessary to distinguish between two derangements of the mind, delirium and mania.

The common distinction has been, that delirium is derangement of the mind with fever, and mania without fever. Those who have given this distinction, have by no means that idea of fever which the author
has

has endeavoured to illustrate; if they meant by fever frequency of the pulse, mania undoubtedly exists very often with frequency of the pulse.

It is rare for a person affected with mania to be seized with fever; it is also very rare for a person in a fever, such as the author is endeavouring to describe, to be seized with mania.

Mania is that derangement of the mind in which, although the material parts of the organs of sensation are in perfect order, yet the mind often takes wrong ideas from them. Although a windmill be painted on the retina, the figure represented to the mind is that of a giant. In delirium, the impression made on the organs of the senses is always imperfect, in as far as the material part is concerned: the eye, for example, is incapable of adjusting itself so as to form a distinct image on the retina, which can be perceived by the mind; but in as far as it can be perceived, it is always true. A man in a delirium never takes one object for another;
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he only has an obscure sensation, which he endeavours to take some idea from. A man in mania; supposing the ideas taken from his senses and brought back by his memory, were true, has his imagination such as often to arrange them perfectly, and his judgment is sometimes clear in determining whether the arrangement is just.

A man in delirium, having no accurate idea impressed by the organs of senses, nor brought up by the memory, has nothing in his mind but complete confusion.

In mania, agreeable objects frequently occupy the mind; in delirium, hardly ever. The patient is wandering among tombs, falling over precipices, deserted by his friends, or perpetually in some other misfortune.

Delirium takes place in many diseases in which there is no fever. In fever delirium may arise from the fever itself, or from certain accidents which take place in irregular fevers. Delirium which takes place from

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fever

fever itself, is at present to be inquired into.

When delirium has taken place from fever itself, it has been generally believed that it arose from an inflammation of the brain. There are indeed some cases recorded, in which it has been said, that upon opening the heads of patients who have died of delirium from fever, a suppuration of the brain has been found. Hence it has been concluded, that delirium in fever has always been owing to inflammation of the brain. The author has caused the heads of many patients, who have died with very great delirium in fever, to be opened, and never found any marks of suppuration. Most commonly the brain appeared exactly as it is commonly found. Sometimes the blood-vessels were distended with blood, but never was any suppuration found. Generally no uncommon appearance at all.

Among the numerous dissections which are made in the anatomical schools, many are made of those who have died of fevers; yet it
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is very rare for any thing like suppuration in the brain to be seen.

It has just been said, that delirium may arise from accidents, which take place in fevers ; such deliriums will be treated of in that dissertation, in which the irregularities which arise in continued fevers will be described.

Delirium, arising from the fever itself, will only here be treated of. Delirium, arising from the fever itself, appears to be of two species; one, in the first place, in which, neither in the body, while it is alive, nor by dissection in the dead body, can any mark of alteration in the material part of the brain be found. In the other we might have some suspicion, even during the lifetime, that the material part of the brain was altered; and some alteration of the material part is actually found upon dissection after the death of the patient.

In that species of delirium, in which there is no mark of affection of the mate-

rial part of the brain during the life of the patient, or on dissection after his death, is it to be supposed that, nevertheless, the material part of the brain is actually affected? Is it to be taken for granted, that the mind exists in the brain, and governs the body, seated as on a throne, sending his messengers to the other parts of his dominions? It may be necessary to consider the question.

The structure of the brain is very grossly and imperfectly known; and its ordinary appearances have been so well described by anatomists, that it is by no means necessary to enter into particulars here. Suffice it to say, that in the human body there are two laminæ, one of a whiter colour, one of a browner grey, laid upon one another, and puckered up as well as could be in the cavity of the scull. The whole is covered on the outside with membranes, which touch and adhere to the scull on the outside, and touch each other on the inside, but do not adhere, so that fluids now and then get between them. From the white part
arises

arises a number of fibres, which run to every part of the body, which we call nerves. When these are cut through, the mind loses its power of producing muscular contraction. From anatomy this is the only reason to suppose, that the mind is situated in the brain, and that it can be deranged by the derangement of the material part of the brain.

Again, certain alterations of the material part of the brain undoubtedly derange the mind. A man whose scull is fractured is generally, in consequence of the mischief done to the brain, rendered delirious. An inflammation of the brain in many cases produces delirium; not in all. This might lead to a belief, that the mind resides in the brain. On the other hand, the nerves going to a part, may be totally cut through in the human body, yet motion in that part may remain; it may live long afterwards, may regain its sensibility, and in consequence affect the mind, even although the nerves were not

again reunited. This was the case in Mr. Hewson, who in dissecting cut the nerve going to one of his fingers; after some time he recovered perfect sensation and use of it, although the nerve never reunited.

Injuries done to other parts of the body, as well as the brain, produce delirium, when there is not the smallest appearance, upon dissection, of any injury done to the brain. Inflammation of the diaphragm produces delirium and death, when on dissection there is no apparent alteration of the brain.

The brain may also be very much altered, almost entirely converted into pus, without delirium. Of this instances have appeared in Dr. Hunter's dissecting room. In one of these, it was well known, that there was no derangement of the mind during the inflammation or suppuration; but the patient was carried off by a disease, in which the brain could hardly be conceived to have its material part at all disordered.

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So far there may be very considerable doubt, whether delirium always arises from disorder of the material part of the brain.

Again, if we refer to our feelings, we undoubtedly feel as if the memory, imagination, and judgment were in the head. The sensations, however, are generally referred to the part of the body to which the application is made; we feel pain in the finger when it is pricked with a needle. The passions are always referred to the breast, as common language shows.

Lastly, the author has in several cases seen it happen, that a delirious patient in fever, without any abatement of any of the other symptoms of the disease, has become perfectly sensible. In all these cases death has followed shortly; that is, in less than twenty-four hours, as if the mind had escaped from the disease of the body before it had left it entirely.

All these considerations have induced a doubt in the author, whether delirium may not arise in fever as an affection of the mind only, independent of any affection of the material part of the body.

Another kind of delirium takes place from the fever itself, and the patient dies in consequence of the delirium; or at least when the delirium is very severe. In this kind, on dissection, the author has found the vessels of the brain, including the whole of it, that is, the brain, cerebellum, membranes, &c. all turgid with blood, although it never happened in any of the cases which he has caused to be dissected, that there was any peculiar affection of one part more than of another, or any thing like suppuration.

From the foregoing statement the author is led to think, that from fever itself, and without any accident or irregularity, two species of delirium arise; one without any material affection of the brain, the other with fulness of the vessels of the brain.

Independently

Independently of this consideration, the author conceives that external appearances of two kinds of delirium take place, in consequence of a regular continued fever itself, which he now means to attempt to describe.

The first species seldom happens in the first paroxysm of a regular continued fever, excepting it be very severe; there is very often some appearance of it in the second evening of the disease; the patient sleeps confusedly; immediately upon waking, does not recollect his bed, or bed chamber, or the people that are about him; but recollection returns in a few minutes, the eyes are sufficiently clear, neither confused nor stupid, nor are the blood vessels fuller than in the ordinary state.

There is a degree of perfect stupidity and listlessness in the appearance of the eye, which takes place not uncommonly in the first exacerbation of a continued fever, which is a very fatal symptom, but which the author thinks is an irregularity in the disease,

disease, and which in consequence will be taken notice of in a future dissertation.

The want of perfect recollection, if the disease is not very violent, goes off generally in the morning, about seven or eight o'clock of the civil day, and the patient remains recollected till the beginning of the fourth paroxysm, but yet not perfectly clear in his ideas, and in full possession of the powers of his mind.

Every evening the delirium grows more and more severe ; but still there is very considerable relaxation in the day time, and this continues to increase until the seventh or eighth day of the disease.

When this kind of delirium arises to a great height, about five or six o'clock in the evening, the patient begins to be very confused ; hardly to know the people about him ; to talk much and confusedly about his affairs ; to be violent. This violence increases till about midnight, when, if the disease is very great, he endeavours to jump out of bed, or tries to climb up to the top
of

of it, and becomes perfectly unmanageable. This goes on till two or three o'clock in the morning. Then by degrees it subsides, and he becomes something more sensible about four or five o'clock in the morning. Afterwards perhaps he gets a little sleep, wakes not so confused, and during the day-time remains more or less sensible to external objects.

These appearances go on much the same for five or six days, if no crisis should take place. About the fourteenth day of the disease this delirium begins to subside; the patient becomes much more sensible in the day-time; the evening attacks become much more conspicuous, although not so violent, until the disease finally goes off, the delirium being almost the first symptom of it that disappears.

The second species of delirium, arising in a regular continued fever from the fever itself, seems to go through the following progress.

It also evidently begins to appear in the second paroxysm of the disease. There is in
the

the evening the same confusion in the perception; the eyes have their vessels somewhat enlarged; the cheeks are a little flushed. These appearances go on increasing during the first week of the disease; the confusion grows greater in the evening, and sometimes all that violent agitation, which has been described in the former species of delirium, takes place; but in that case the patient does not recover in the morning, but lies stupid and almost insensible. Afterwards if the disease be very violent, stronger and more violent delirium begins to take place between five and six o'clock in the evening, which increases until two or three o'clock in the morning, and then by degrees the patient again falls into the same stupor. If this should continue till about the fourteenth day, the evening attacks become by degrees less, but the stupor continues, with deafness, and inattention to external objects, and these appearances remain the very last symptoms of the disease.

The author is rather induced to believe, from the fulness of the vessels of the eye, the flushing of the face, and the continuance of the stupor after the fever is gone off, that in this species of delirium the material part of the brain is affected, especially as when patients have died of this species of delirium, the author, upon dissection, has found the vessels of the brain distended with blood.

It is to be observed, however, that between these two appearances of delirium there are gradations, as we find in almost every thing relating to the human body.

Whether the author be right or no, in supposing that there are these two species of delirium depending upon fever itself, delirium, whether it be of one species, or if both species exist, affects not only the mind, but the functions of the body also.

From the 2d day of the disease the delirium, if it takes place, gradually increases, and along with it all the appearances of fever; the tongue
grows

grows fouler from the beginning to the middle of the second week, excepting where there are appearances of putrefaction, as have already been enumerated, there is no sliminess, but a greater crust. Towards the end of the second week this crust, more or less, disappears, and the surface of the tongue looks raw when moist, when dry has a polished glaze, especially about the middle, some of the crust remaining upon the sides, towards the edges. The skin has a more dusky colour, and feels uneasy; the patient picks hairs from the bed-cloaths. The eyes appear more confused. Black spots seem to the patient to be moving in the air. The appetite is more or less diminished, and often totally lost. Spasmodic contractions of the intestines take place in a greater degree. The pain in the forehead, or rather the sensation of it, is not so much complained of. The secretions continue suppressed, the skin dry, &c. There are greater flatulencies, and the fever every way increases along with the delirium,

Whether

Whether it be that the fever is gradually increasing, and delirium along with it, or that delirium is the occasion of the increase of it, the fever goes on in proportion with the delirium. Although the patient should be insensible to all external objects; although he should sleep very little, or scarcely at all; yet, if the deglutition and respiration should remain unimpeded, the patient is not to be despaired of; it happens even most commonly that he recovers. But if he respire with great difficulty, or hardly at all, or if the deglutition be almost totally prevented, or if attempting, it throws the patient into convulsive contractions, he rarely recovers.

On the other hand, if the other febrile appearances do not keep pace with the delirium; though the pulse should become more slow, and less obstructed; though the tongue should become cleaner and moister; though the colour of the skin should become more natural, the secretory vessels more relaxed; if, however, the delirium should still continue, without stupor or deafness,

deafness, and the other marks which have been pointed as accompanying delirium, with fulness of the vessels of the brain; in such case, notwithstanding the practitioner and by-stander are flattered, the patient is frequently cut off. When these last described appearances take place, that is, if delirium continues of the first kind without diminution, the author has conceived that some mischief has happened to the brain, or some other part of the body; but although he has caused several to be opened who have died under these circumstances, he has never been able to find any appearance different from what is commonly found in persons dying of diseases, which make no alteration in the structure of the body.

Thus the fever continues to increase from the beginning of the first, and sometimes to the middle of the second week of the disease, and continues in the same degree, unless it should be carried off by a crisis. A crisis in a continued fever, as described by Hippocrates, has been a matter of great
debate,

debate, not only since, but probably long before his time. A crisis which takes place in a regular continued fever may be considered in the following manner :

The author has endeavoured to state, that a continued fever differs from an intermittent, or remittent, in this, that in an intermittent or remittent the paroxysms, or exacerbations, recur principally between six o'clock in the morning and five o'clock in the evening of the civil day; but that in continued fevers the exacerbations take place between five and six o'clock in the evening.

When a very severe exacerbation occurs in a regular tertian intermittent, the author has already said, in a dissertation on that subject, that a complete crisis sometimes takes place, and carries off the disease. In like manner, in continued fever, if a strong exacerbation should happen in the evening, the severity of the attack may prove fatal; but on the other hand, instead of producing a relaxation only between five and six o'clock in the morning, it may occa-

sion a complete crisis, and so in a few hours terminate the disease.

In speaking of a crisis in a regular continued fever, it is always to be understood, and is so considered by Hippocrates, that there may be a bad crisis, and even a fatal one, from the violence of the attack of that paroxysm; or a good crisis carrying off the disease altogether, or giving great relief to the patient.

The first thing to be taken into consideration is, whether any such crisis ever takes place or not. How this should have become a question can hardly be conceived, since instances of such crises must have occurred to every practitioner who has had occasion to see a number of cases of the disease. Others have insisted, that crises happen in all continued fevers. This opinion can never be held by any practitioner who has had much practice in this country.

In different climates, the taking place of crises has been variously described. In very
hot

hot climates, fevers are represented by practitioners versed in the diseases of those climates, as if they were all intermittent or remittent; in which case, more or less perfect crises always take place: to wit, in climates in which the temperature of the atmosphere in the shade is from about eighty degrees to one hundred, or an hundred and ten.

The same thing is also true where the variation of the temperature is very great. In Carolina, for example, where in one day, from the variation of the wind, the heat may rise from under ten to upwards of sixty degrees of Fahrenheit's thermometer. In countries not quite so hot, and not so variable, as in the Mediterranean, authors have described continued fevers as almost always terminating by crisis. In this country, as far as the author's observation has gone, hardly one third of fevers have been carried off by crises, such as the author has just described. In colder countries, where the inhabitants expose themselves to the temperature of the cold atmosphere, as in Siberia, continued fevers are

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very

very rare, and crises scarcely ever take place in them.

Hippocrates has not only laid down that continued fevers are terminated by crises, but also that these crises take place on certain particular days of the disease, which he has called critical days. This doctrine has afforded a ground of great dispute.

When it is affirmed, that a fever terminates on a certain day of the disease by crisis, the first question undoubtedly is, what is to be accounted the first day of the disease. The author has endeavoured to show, that the beginning of the fever is not to be counted from the hour of the first attack, but from the second attack, or first exacerbation of the disease, which begins between five and six o'clock in the evening. He has said, that most commonly, if the disease begins before six o'clock in the morning, the second attack takes place between five and six o'clock in the evening of the same civil day, and by consequence that the fever is to be considered as beginning between
five

five and six o'clock in the evening of the preceding civil day; but that generally, if the first attack be after six o'clock in the morning of the civil day, as is commonly the case, the fever cannot be considered as beginning till five or six o'clock in the evening of the same civil day, the second attack, or first exacerbation of the disease, not happening till five or six o'clock in the evening of the subsequent civil day.

In other words, supposing the disease should take place between six o'clock in the morning of Sunday, and six o'clock in the morning of Monday, the beginning of the first day of the fever must generally be taken between five and six o'clock in the evening of Sunday.

There are some cases in which there are exceptions, but these will be considered among the irregularities which take place in the disease.

Having thus pointed out from what time we are to reckon the beginning of the disease,

that crises take place in the first twelve hours of the exacerbation, it will be easy to settle the days of the disease on which crises occur.

Excepting in intermittent and remittent fevers, crises very rarely happen in the first week of the disease unless on the seventh day. Hippocrates enumerates, however, in the different works ascribed to him, the fifth, sixth, seventh, ninth, eleventh, thirteenth and fourteenth, seventeenth, twentieth, and twenty-first days as critical days. He also says, that although these be the true critical days, yet that there are spurious critical days, viz. the eighth, tenth, and twelfth, &c. and that it is known whether the fever had perfect or spurious critical days, by one day being an indication of another. That is, if you find a strong exacerbation take place on the seventh, and also considerable relaxation between five and six o'clock in the morning; if you find a coldness take place about six o'clock in the evening, or at least considerable dryness of the skin, very great heat,
greater

greater foulness of the tongue, and more violent delirium on the beginning of the seventh day, viz. between five and six o'clock in the evening, and if these appearances increase very much till three or four o'clock in the morning, and then subside, and the patient is more sensible than he was the morning before; if his skin and tongue become moister, his tongue cleaner, and the secretory vessels relaxed, although no complete crisis take place, you are to consider in that fever the seventh, ninth days, &c. as the true critical days, and that the patient had a better chance of recovering on these days. On the other hand, if a stronger attack and greater relaxation take place first, at the beginning of the eighth day of the disease, then the disease will observe spurious critical days, and the tenth, twelfth, &c. will be the critical days, and the patient will have more chance of recovering on these days; but in this last case he will have a less chance of the crisis being so perfect, or carrying off the disease.

The only plausible mode of accounting for these critical days, is that which was pointed out by Dr. Cullen, in a clinical lecture he gave about the year 1797 ; to wit, that continued fevers observed in some degree the types of intermittents.

He said, that during the first week of a continued fever it observed the quotidian type; that in the second it observed the tertian type, and in the third week the quartan type : that is to say, that in the first every day's paroxysm increased ; by which is to be understood, that the third paroxysm was greater than the second ; the symptoms of the fourth were more severe than those of the third, &c. that in the second week there was a stronger exacerbation one day, and less strong the next day; that in the third week there was a strong exacerbation on one day, on the two subsequent days a weaker exacerbation, and that on the beginning of the fourth day, counting exclusively, a stronger exacerbation again took place.

Again,

Again, he said, that it often happened in intermitting fevers, that a paroxysm occurs every day, but that the paroxysms were unequal: the paroxysms every other day being slighter, every other day more severe; or that they might begin at other times of the day.

In other words, supposing a severe paroxysm, after the intermittent was formed, took place on Sunday at noon, a paroxysm might take place on Monday, which might be either at noon, at ten or eleven o'clock in the morning, or one or two in the afternoon, but less severe: and again, that on Tuesday a stronger paroxysm took place at noon, similar to that which took place on Sunday; and that a slighter paroxysm might take place on Wednesday similar to that which took place on Monday.

Such cases he called double tertians: they were also called double tertians by many of the ancient Greek and Roman physicians,
and

and likewise by practitioners after the revival of the science of medicine in Europe.

In such cases, Dr. Cullen observed, that the severe paroxysms were shorter, and productive of more perfect crises; if therefore the continued fever should be governed by a tertian type in the second week of the disease, that then the paroxysms, or exacerbations, might recur every day, but be more strong every other day, and terminate with a more perfect crisis, they might be so short, and terminate with such a perfect crisis; as entirely to carry off the disease.

In like manner, if a continued fever observed a quartan type, and there were two slight exacerbations after a severer one, followed by two slight exacerbations, and then again a severer exacerbation, and so on, there was a greater likelihood of the severe exacerbation being the shortest, and followed by a more perfect crisis, and often by so perfect a crisis as to terminate the disease.

Connecting this idea with what has been said above, a continued fever observes the
quotidian

quotidian type in the first week. If a crisis takes place after the first two or three exacerbations, the disease recurs, and becomes an intermittent fever. But if it goes on as far as the fifth day, and a crisis should take place on the fifth day of the disease, that crisis would terminate the fever entirely: the same thing may be said of the sixth day; but these two days seem to be uncertainly marked as critical days, complete crises happening on them very rarely.

If the first paroxysm of the tertian type should take place on the seventh day, then there would be a chance of a crisis on that day; and in consequence, on the ninth, eleventh, and thirteenth days.

As far as is known, there is no reason for believing that the fever changes its type more frequently on the seventh than upon the eighth day; and therefore if the fever changes its type on the eighth day, the eighth, tenth and twelfth would become the critical days in the second week, and according to Hippocrates would be spurious critical days. Hippocrates

crates accordingly says, that if you find a feverer attack take place at the beginning of the seventh day, and go off with some critical symptoms, such as moisture on the skin, greater cleanness of the tongue, &c. then you are to conclude that the seventh, ninth, eleventh and thirteenth days are the critical days of the second week. If a stronger exacerbation should take place on the sixth or eighth days, followed by critical appearances, as have been above observed, then you are to reckon the eighth, tenth, and twelfth the critical days of the second week ; and so far, according to Hippocrates, the critical days are the days of the stronger exacerbations of the tertian type in the second week.

If again the fourteenth day should be the first day of the quartan type, then there would be greater disposition to crisis on that day. Indeed the fourteenth day is by much the most common day on which a crisis takes place. If the fever was now observing a quartan type, the fifteenth and sixteenth days being days of weaker exacerbations,

tions, there would be little chance of crisis upon them; on the seventeenth day there would be a stronger exacerbation according to the quartan type, and in consequence a greater disposition to crisis; on the eighteenth and nineteenth days, there being weaker exacerbations according to the quartan type, there would again be less chance of crisis upon these days; but on the twentieth day, there being a stronger exacerbation again, according to the quartan type, there would be greater chance of crisis upon that day. This doctrine will by no means agree for the twenty-first day, which it is more probable that Hippocrates, and the physicians of his time, reckoned the critical day, instead of the twentieth, because it was an odd day, which they considered more fortunate than an even day. This whim was probably the ground of their considering the seventh, ninth days, &c. as being the true critical days, and the eighth, tenth, &c. as spurious critical days.

In compliance with this idea, some of those authors who have admitted the fourteenth

teenth as the most common critical day, as it has actually been found in practice, have called it an odd day, because it was the second seventh, and so have perhaps likewise admitted the twenty-first among the critical days as the third seventh.

The truth of this doctrine may also be supported by what happens in hot and in cold climates.

It has already been said, that crisis much seldomer take place in cold climates than in hot climates; and also that fevers are much oftener intermittents and remittents in hot than in cold climates: it is much more probable, therefore; that as intermittents are governed by types, that types have a greater power over continued fevers likewise in hot climates than in cold ones. This perfectly accords with Dr. Cullen's doctrine.

It has already been said, that not above one third part of the fevers which happen in London are terminated by a crisis; that

is to say, in not above a third part of the fevers which happen in London, does a much stronger attack take place in the evening than took place in the evening of the civil day before, and kill the patient, or otherwise terminate with so complete a freedom from the disease before eight o'clock in the morning, as to render him, should there be no relapse, perfectly safe.

In cases in which no actual crises take place, still it happens sometimes, but not always, that there are stronger exacerbations every other day in the second week, and every fourth day in the third, in regular fever happening in this country.

By the end of the seventh day the fever has often increased to nearly its greatest height, when it is regular. The second week is sometimes gone through without very distressing symptoms, and sometimes cases with symptoms of the greatest distress and danger occur; and there are all gradations between these extremes.

It

It is necessary that the author should here observe, that he has been describing the disease and its progress, when it has not been increased, or rendered irregular by imprudent practice.

The appearances, then, in the second week are sometimes frequency of the pulse, to perhaps an hundred, or an hundred and five, in the evening; and in the morning from ninety-five to an hundred. In many cases of fever the pulse is much more frequent, but this will be described as an irregularity in a future dissertation.

The tongue is covered with a brownish fur, which is not slimy, excepting when putrefaction takes place, as has already been described. When the disease is severe, it is not uncommon for the middle of the tongue especially to lose this fur, and appear, when moist, cleaner and rawer than it is in its natural state, and, when dry, with a degree of polish, as if it were glazed over.

The

The eyes have always, provided the fever be regular, a degree of confusion; but it is greater or less as there is more or less delirium, as has already been described. The skin is of a dirty dusky colour; this symptom is in a greater or less degree, according to the violence of the disease.

The head-ach is often less complained of by the patient, but this appears rather to depend upon the confusion of the mind than on the head's being actually relieved.

The appetite is often totally lost. The patient frequently complains less of thirst during the second than during the first week; but this want of thirst seems rather to be from the confusion of the mind; for sometimes, especially when the fever is very violent, he will drink a great quantity at once, and at other times, in the same circumstances, will hardly drink an ounce. The skin continues very dry and parched, that is, feels very hot and dry to the bystander.

The urine continues perfectly transparent, as has been described.

There are flatulencies in the intestines, generally with costiveness; but now and then there are one or two thin and very foetid evacuations in twenty-four hours, even when there is no other appearance of putrefaction.

The sleep, when the patient gets any, is more or less quiet, partly according to the delirium, and partly according to the general restlessness.

If the fever should be slight, and perfectly regular; if the practitioner has patience, and does not press the patient with improper remedies, nor the by-standers with improper nourishment, this stage of the disease passes over with tolerable tranquillity. On the other hand, if the delirium, and other symptoms of fever, be very violent, it proceeds with the utmost anxiety to the practitioner and danger to the patient. This happens in all gradations, from the most severe and fatal to the slightest.

Provided

Provided there has not been such a depression of strength as to occasion putrefaction of the fluids, and by that means to destroy the patient, and that neither of the kinds of delirium which have been described should prove fatal; or provided the patient should not be destroyed, by strong symptoms of fever taking place at the beginning of a critical paroxysm; and the delirium, if of the first species described, keeps pace with the other symptoms of the first stage; or provided it be of the second species, if it begins to be converted into deafness and stupor: and provided, that the fever was of itself perfectly regular, and, lastly, that it has not been rendered irregular by improper treatment, it rarely happens that it is dangerous after the second week.

On the fifteenth day, and often sooner, the symptoms of the disease begin to abate. The first appearance of this abatement is not uncommonly a cleanness and healthy look about the edges of the tongue; or sometimes the skin becomes of a more natural colour; sometimes, although not

very generally, a sweating takes place all over the body, and the skin afterwards continues moist. The delirium, if it be of the first kind, abates in the day-time, and returns at night; if of the second kind, the patient is deaf and stupid, with little difference in the twenty-four hours; and this deafness and stupor remain until the whole of the disease has disappeared.

The depression of strength generally goes off, but leaves real weakness behind; this is not in any case more conspicuous, than when the depression has been so great as to occasion putrefaction of the fluids. In this case, all the appearances of putrefaction which have been already described begin to disappear; that is to say, the tongue is no longer covered with slime, nor the teeth buried in it, but generally looks raw, if moist, and with a polished gloss on the surface when dry; the marbling goes off from the skin; or, if there were any purple spots, these become yellowish and disappear; the breath and secretions no longer are foetid, nor bear any other marks of putrefaction. This
diminution

diminution of the appearances of putrefaction does not happen at once, excepting a crisis should take place, when they go off almost entirely in one night.

It is to be remarked, that in the second week of the disease it often happens, that an eruption takes place on the skin quite different from that marbling, or those purple spots, which arise from the putrefaction of the fluids. This eruption sometimes happens even in the first week of the fever, but much more commonly in the second week of the disease. It occurs principally about the neck and breast, and resembles very much the appearance of flea bites; that is, there are a number of small brownish red specks, often not the twentieth part of an inch in diameter, with a brownness of the surrounding skin. How or why this eruption takes place the author could never satisfy himself, and perhaps it is of no great importance, since the course of the fever is not at all altered by it. The fever is neither increased nor diminished by its appearance, nor any ways apparently altered; neither is

there any increase, alteration, or diminution of the fever, upon its going off, which it does commonly in a few days.

There is also another kind of eruption, which does not commonly take place before the third week of the disease, and more frequently when there have been symptoms of putrefaction in the first and second week. This eruption consists of excrescences, something like warts, but of less diameter, and greater height from the skin, of a blackish colour, and pretty fine texture. The author has likewise not been able to discern any cause of their taking place, or any consequence arising from them, either in the appearances of the fever itself or otherwise, to the patient. This eruption is much less frequent than the one just described. The eruptions are not nearly so numerous, nor are they dispersed all over the body. These seldom appear before the end of the second week. They go off, or rather the excrescences drop off, about the middle of the third week, without any increase or diminution of the disease.

To

To return to the abatement of the disease in the third week : the urine deposits sometimes a copious lateritious sediment for a day or two, and afterwards returns to its natural appearance. Sometimes there is a copious lateritious sediment in the urine made in the night time, and a mucous one in that made in the day time. The coctiveness goes off, and the fœces return to their ordinary appearance. The eyes, unless when the delirium has ended in stupor, begin to have a more healthy appearance, are more composed, and express a greater attention to the objects around them. All the secretions become gradually increased, not equally, but sometimes one more and sometimes another. The sleep returns, but not equally, the patient sometimes passing a tolerable, at others a restless night. There is sometimes a greater degree of thirst than was expressed in the second week. The appetite returns, although seldom regularly; sometimes it is voracious, but the patient is notwithstanding satisfied with a very small quantity of food; in other cases it returns very slowly. The depression of strength sometimes goes

off almost at once, and what is singular, leaves the patient with a greater feel of weakness. Thus the disease goes off, and the patient recovers his strength very quickly.

The cases, in which relapses take place, will be described in that dissertation which will treat of irregular continued fever.

The author comes now to lay before the public the treatment of a regular continued fever.

It has been stated, that in the ordinary course of a regular continued fever there are two means, by which the patient may get clear of the disease and recover, without the aid of medicines. One of these means is crisis, which terminates the disease most commonly in the second or third week, in less than twenty-four hours. The other is, the disease beginning to diminish after the fourteenth day, and going off of itself without any marked crisis. If either of these means of the disease terminating, by the efforts which arise in its ordinary progress,

progress, always took place, the practitioner would, in that case, have nothing further to do, than to take care that the patient should be supplied with proper nourishment to support him through the disease, and prevent any accident which would destroy him.

It has also been observed, that sometimes depression of strength, sometimes the attack in the critical paroxysm, sometimes the delirium, even when it keeps pace with the other appearances of the disease, is fatal.

There arises, therefore, a question, whether fever is to be left to itself, to go through its ordinary course, or whether means are to be taken to carry it off, and what these means are.

In considering this subject, it is evident, that if there was any medicine that would certainly carry off the fever immediately, or soon after its exhibition, and would act equally and certainly in all fevers, it would be infinitely better to employ such medicine,

medicine, and immediately relieve the patient from the pain and uncertainty of the disease, than allow it to pursue its course.

It is true that any attempt to carry off fever has been reprobated by many practitioners of great experience. Many practitioners have believed that some humour, that is to say, some noxious fluid, or, to give the doctrine its full scope, some noxious solid or vapour, had, by some means, got into, or had been produced in the body; and that fever was only an exertion of the body to destroy or evacuate this matter, or convert it to an innoxious or useful substance.

The author never read or heard of any experiments, by which any such noxious matter was proved to exist. It appears, indeed, that sometimes a degree of putrefaction arises in the body, but this has been already sufficiently considered.

In the next place, the author has already observed, that all fevers produce some substance, which, applied to the body of a man

man in perfect health, had a tendency to produce, and actually has produced fever in many cases; but he has also endeavoured to shew, that this infectious matter has no influence on the fever when it has once been produced.

In practice it is found, that if a person, ill of a fever, has that fever terminated, in consequence of medicines employed, the fever does not return, nor does any other disease take place.

It is exceedingly difficult to argue on the negative side of a question. If a man in any science makes an assertion, it behoves him to bring some proof of such assertion. This has unfortunately been very rarely the case; in medicine a man has very often taken his own whim as the truth, without bringing any proof. If there be actually any noxious substance in the body, why have not those practitioners, who have said there was, pointed out its properties? Is it solid; is it fluid; or is it in vapour, in the heat of the human body? Is it red; is it yellow, or is it blue, or any mixture of

of these colours? Is it hard or soft? Has it any taste or smell? What is its specific gravity? Have its effects been investigated in mixing or combining it with various other substances? If those who suppose such matter to exist, have not shewn that it can be investigated by any of these or other qualities, it is a mere phantom of their own brain.

It has been a common assertion, that although you are not able to demonstrate it by any such quality, yet it cannot be demonstrated that it is not. As well might they say, that the moon can not be demonstrated not to consist of cream cheese.

So far, therefore, in treating a patient in fever, this idea of humour is to be totally neglected.

Since so many practitioners of eminence have assumed the idea, that there is some humour or matter in the body, it may be worth while to enquire into the origin of such belief.

In

In fever itself, there is only one appearance which can give any shadow of probability to such a doctrine. This is, if a crisis should happen in a fever, which appears to be a continued one, on the first, third, or fourth days of the disease, it commonly returns and continues as an intermittent. If a crisis should take place soon in the beginning of the second week, and not be quite perfect in itself, relapses frequently take place. If a crisis should take place towards the end of the second week, it is seldom that the fever returns, although the crisis should not be quite complete. In the third week of the disease, if any thing like a crisis should make its appearance, the disease almost always goes off.

It has been said, that this depends upon an effort of nature to throw noxious matter out of the system. That, at the beginning of the disease, this matter is not concocted, and that the effort of nature is premature. That therefore the matter remaining, occasions the fever to return, and to become an intermittent. That when the

crisis does not take place till towards the end of the first, or beginning of the second week, the matter is more concocted, and therefore nature, by her efforts, throws off a larger quantity, and there is not enough left to occasion an intermittent, but a sufficient quantity sometimes to occasion a relapse. That if nature does not make an effort to produce a crisis till towards the end of the second or third week, the matter has been so far concocted, that it is in no way longer capable of reproducing the disease. The author can only consider all this as a repetition of the same facts in other terms.

What is nature? Is it a discerning being? If it is, it is very much mistaken when it tries to throw matter out of the body before it is concocted. Nature indeed is a word so vague, and is applied in such ambiguous and various ways, that it is impossible it should be understood. It is a term under which men are always inclined to hide their ignorance. The author is not disposed to point out the various ways in which it has been used; he refers his readers

ers to Lord Bacon; he only means here to endeavour to point out the meaning, as far as he can judge, in which it has been taken by those, who have said that she endeavours to produce a crisis in fever before matter is concocted.

A man is born with few or no ideas; whether with any or no is a proposition the author does not mean to argue. When he comes into the world, his eyes open, objects form pictures on the retina, and by degrees impress ideas on the mind. It has been said, that nature produced these ideas; in that case, it would undoubtedly be perfectly superfluous that pictures should be painted on the retina. The same thing may be said of all the other impressions made on the other organs of the senses. A man, when he is born, has his teeth formed in his jaw-bone. If after the proper time of his receiving nourishment by sucking the breast of his mother, the teeth rise up, and cut through the gum, it has been said that nature made his teeth rise up, when it is necessary to cut through solid food.

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food. It is undoubtedly the Almighty, who cannot err, that made this contrivance, and not nature, a secondary, fallible, and imaginary being.

In like manner, in inflammation a quantity of fluid is extravasated into the cavity or cavities of the inflamed part; this matter, so extravasated, is converted into pus, destroys the part originally inflamed, makes its way externally, and is evacuated out of the system, leaving a cavity, which is afterwards filled up by granulating flesh; a fresh skin is formed over this, and the granulating flesh is converted into parts similar to those which were destroyed. This surely was a contrivance of that Being, who in his infinite wisdom created all things. Why should we transfer it to a secondary imaginary being?

So in fever, the author has endeavoured to shew, that when the attack of fever takes place, it is followed by a hot fit; that the operations of the body which take place in the hot fit, have a tendency to carry off the

the derangement which had taken place in the cold fit. So it has pleased the Almighty to give powers to the human body capable of producing a crisis which carries off the disease. Why should there here be introduced such an imaginary being as nature, to make blunders, not knowing when some other imaginary substance has suffered an imaginary change? Is it not much easier comprehended, that the body is so constructed, that in all paroxysms of fever an effort is produced to carry off the disease, although that effort does not always succeed?

Nor do other efforts always succeed that the Almighty has pleased to give to animated beings. All seeds of plants attempt to grow; not one in a million succeeds. A single cod fish lays three thousand eggs in a year; not three of these produce cod fish which arrive at maturity.

It is not therefore singular, although the Almighty has chosen so to form the human body, that every attack of fever should pro-

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duce a hot fit, in which operations of the body arise which tend to carry off the disease, that these operations do not always succeed. Is it then necessary to have any reference to a secondary and imaginary being, who may make a blunder, and try to carry off matter before it is prepared for it?

The fact is, that a fever begins gradually, increases to a certain point, continues in that degree for a certain time; afterwards, if the patient is not killed in the manner already mentioned, or cured by a complete crisis, it gradually diminishes, and goes off without any cause which has as yet been discovered.

To return to the consideration, whether a fever should be left to itself, without the practitioner employing any means to carry off the disease, but only attend to the patient during the progress of it; or whether he ought to employ any remedy to attempt to carry it off, either by producing a perfect crisis, or by carrying off the disease, without any attention to

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the natural crisis by which it is frequently cured.

The first thing which influences the practice is, what remedies have been found out, by which a perfect crisis may be produced, or the disease be carried off, without any attention to the natural progress or cure of it. The first thing that is of moment in attending to this proposition, is the efficacy of such medicines as have been employed for the purpose of shortening the duration of fever, without having any attention to what happens in its ordinary course. Whether actually more fevers have been cured, and the patient has perfectly recovered when such medicines have been employed, or when the fever has gone through its ordinary course.

This question is exceedingly difficult to determine, from the very great inaccuracy of the evidence of medicine; an inaccuracy so great, that the author has no means of determining the question. It is true that, besides his private practice, he has been

physician to an hospital, which receives nearly four thousand patients in a year, for upwards of twenty-five years; and in which hospital fevers are diseases which patients labouring under are always admitted in preference. There is almost always, also, febrile infection, which frequently produces fevers in this hospital, notwithstanding the utmost precaution to keep it clean and well aired. He therefore might be supposed to possess sufficient evidence, whether a regular continued fever more frequently terminates in patients being restored to health, when they are left entirely to themselves, excepting for the attendance given them, their receiving proper nourishment, and other attentions during the progress of the disease; or whether a greater number recover, when means are employed to shorten the disease. It must be observed, however, that those people brought into the hospital already afflicted with fever, have had that fever disturbed, by remedies employed before the patients are received into the hospital. This cannot generally be found out. These fevers are besides rendered irregular by the motion

motion and fatigue of bringing them into the hospital. Those who catch the fever in the hospital are often ill of other diseases, the symptoms of which diseases are so intermingled with the fever, as to render it perfectly irregular. From these causes the author has not been able to discriminate, with any degree of certainty, what number of patients would recover, supposing they were taken ill of a regular continued fever, and supposing it was to pursue its ordinary course without the assistance of medicine.

In the second place, the practice of medicine is so unfortunately constituted in this country, that when a person is taken ill of any disease, he generally does whatever the first violent man he meets with tells him is proper to be done. Or he applies to mercenary practitioners, whose real business it is to mix medicines according to the prescriptions of physicians who are supposed to have studied the art, without those practitioners being able to distinguish whether the cases are the same. Supposing, therefore, that

physicians were even very perfect in the knowledge of fever, the disease is commonly totally deranged before it comes under their inspection. If they were to endeavour to lay down the evidences by which it might be determined, whether a regular continued fever, in pursuing its ordinary course, would more frequently terminate in health, supposing it was left to itself, the practitioner attending only to giving the patient proper food, and taking care that those other things, which are called non-naturals, to wit, sleep, secretions, &c. be properly administered; or whether he would more frequently recover when medicines were administered, it would be hardly possible, without such a formula, as the author has already pointed out, in the *Medical and Chirurgical Transactions*, to determine the question with any degree of accuracy.

It is further to be lamented, that where this difficulty does not take place, as it certainly does not in several parts of Europe, where the practice falls entirely into the hands of physicians, no sets of comparative

parative cases have been recorded. These physicians have not pointed out whether the disease, in pursuing its own ordinary course, those things which have commonly been called non-naturals having been only attended to, has oftener terminated in health, than in such cases where medicines have been employed to carry off the disease. Physicians have been too often more anxious to recommend some favourite practice or medicine, than, divesting themselves of all prejudice, to endeavour to render medicine as certain a science as it will admit of.

Such being the situation of the subject, how can the author determine whether, supposing fever was perfectly regular, it would be better to let the disease go through its whole course, or endeavour to carry it off by medicine. It is therefore left to him to shew how to conduct the patient through the disease, supposing the fever perfectly regular in itself, and that nothing has as yet been discovered, which will carry off the disease at once, and in the second place, to consider what are the powers of the medi-

cines, which have been supposed to produce a crisis similar to that which takes place in the ordinary course of a continued fever, as has already been described ; or carries off the disease, altogether dissimilar to those which put an end to it in its ordinary course,

The first argument, therefore, to be pursued, is, what attentions are to be paid, supposing we are to do nothing that shall prevent the fever from going through its ordinary course.

The first attention to be paid is to the situation of the patient. Man evidently was originally an inhabitant of a warm climate only. In such a climate, he wants no more covering to defend him from the inclemency of the atmosphere, than what he was born with, or afterwards grows upon him. He was probably driven into colder climes by war, and in colder climes he began to have more vigour ; still, however, it was necessary for him, even in perfect health,

health, to defend himself by external cloathing, and, when without exercise, to give heat to the atmosphere, by various means which he had invented, particularly by the burning of fuel.

A man affected with fever has the powers of his system depressed, and therefore cannot defend himself against the cold of the atmosphere. Besides, a degree of cold greater than a man has been accustomed to contracts all the external vessels, and therefore prevents that relaxation which ought to take place in the crisis, and of consequence tends to prevent a crisis from taking place. It also tends to render the diminution of the disease in the morning less considerable. On these accounts, a man in a fever should not be suffered to remain in too cold an atmosphere, or any other medium of too small a degree of heat.

The heat of the surrounding bodies has a different effect on the human body, according to the degree of heat it is accustomed
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to bear. If a man is accustomed to live in a heat of ninety degrees of Fahrenheit's thermometer, he will feel surrounding bodies, heated to seventy degrees, extremely cold; he will feel them as cold as a man, accustomed to live in seventy degrees of heat, will feel a medium that he is in, if it be of sixty degrees; therefore, in defining the heat in which a man should be kept in a fever, reference must be had to the country he is in. In London, in the summer, an atmosphere, heated to sixty-five degrees, will not do mischief from being too cold. In winter, an atmosphere heated to fifty-five degrees, will not be noxious from its cold. In other climates different rules will take place; what these rules are, the author cannot accurately lay down. He conjectures, however, from what information he can procure, that in the warmest climates eighty degrees would not be noxious, from its cold in the atmosphere, and that in the coldest climate less than fifty degrees would be hurtful.

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There is a great difference, however, in the degree of heat which the atmosphere should have, and the degree of heat of which the substances immediately surrounding the body ought to be.

The atmosphere is often only applied to the face, and drawn into the lungs, especially when a man is in bed. The face has been accustomed to various changes in the atmosphere, and whatever part has been accustomed to such changes is much less affected by them. With respect to the lungs, the atmosphere is tempered in its passage through the nostrils, mouth and throat, larynx, and the beginning of the trachea, so that it cannot go so cold into the lungs as to affect them much from its temperature. Moreover, there is in the atmosphere about a fourth part of a vapour, which we call pure air, which is necessary to be applied so as to affect the blood in the lungs, to give the necessary vigour to the system. As in a fever there is a greater depression of strength, it certainly ought not be otherwise depressed, from a sufficient quantity of pure air not being

being thrown into them. As the warmer the air of the atmosphere is, it will be more rarefied, therefore a less quantity of pure air will be contained in the same volume when the atmosphere is warm ; a little greater degree of coldness of the atmosphere thrown into the lungs will be counterbalanced by a greater quantity of pure air giving vigour to the system. On these accounts, the atmosphere in which the patient is may be colder than the bodies which immediately surround him.

With regard to the bodies which immediately surround him, their heat should be much superior to the heat of the atmosphere, in order that they may not do mischief, by producing contraction, thereby increasing the fever, and preventing relaxation and crisis from taking place. In this country, the heat of bodies immediately surrounding the patient should never be less than seventy-five in winter, or eighty degrees in summer.

The next thing to be attended to is, how this temperature of the atmosphere, and likewise

likewise the temperature of the bodies immediately surrounding the patient, are to be kept up.

In the first place, if the atmosphere be of too cold a temperature, its heat ought to be increased by some means which will not diminish the proportion of pure air in it, nor introduce into it any noxious vapour, or any noxious fluid, or solid, floating in it in small particles.

According to the means which men have of procuring conveniencies, either in sickness or in health, different measures ought to be, and where the means are not sufficient must be pursued, according to what can be afforded.

If a man has sufficient means, the best mode of warming the atmosphere is, to allow the air to enter into vessels surrounded by boiling water; afterwards to pass into vessels cooled by any means to at least sixty degrees of Fahrenheit's thermometer, there being in these vessels a means of allowing
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any water condensed to pass off, without any communication between the vapour contained and the vapour of the external atmosphere. The air should then pass from these vessels into another set of vessels, surrounded by boiling water; and from these the air, so heated, should enter into the bed-chamber of the patient, so as to keep its heat up to the degree which has been pointed out. The advantage of this apparatus is, that all the water which was suspended in the air of the external atmosphere will be dissolved in it, when it is drawn into the vessels surrounded by the boiling water, as hot air dissolves a much greater quantity of water than cold air. When the air is carried from the vessels surrounded by boiling water into the vessels cooled to sixty degrees or under, the sides of these vessels will cool the air next to them, and precipitate the water dissolved in it as the air passes along, and all of it successively comes in contact with the sides of the cold vessels. All the water which cannot be dissolved in the air in the heat of sixty degrees, or whatever less degree of heat is applied, will

will be precipitated, and carry along with it all other noxious solid, or fluid particles, which will pass off along with the water in the apparatus applied for that purpose; and thus the air will be left pure. The air warmed by the second set of vessels surrounded by the boiling water, may be let into the bed-chamber of the patient, in such quantity as to give the proper degree of heat.

Such would be the most perfect means of warming the chamber of a patient afflicted with fever. It is in the next place necessary for the author to state, how, when such means are not in readiness, heat may be produced in a proper degree.

The first thing to be attended to is, that the mode of producing heat shall not diminish the proportion of pure air in the atmosphere, nor introduce any noxious vapour, or any noxious fluid, or solid particles floating in the atmosphere. Therefore no fuel, for the burning of fuel is the common mode of producing

producing heat, should be burnt in the room, without all the vapours arising from it being entirely carried off. For besides that the burning of fuel destroys a quantity of pure air, and renders it totally unfit for respiration, and therefore would oblige the patient, whose strength is already too much depressed, to make deeper or more frequent respirations, so that his strength would be further exhausted; there are also very often noxious substances, vapours, or small particles of solids or fluids, produced by the burning of fuel. If there be, for example, pyrites or arsenical ores in the fuel, volatile vitriolic acid, calx of arsenick, and other noxious matters, will be mixed with the atmosphere which the patient breathes. From this consideration, the rooms in which the patient afflicted with fever is, should never be heated by fuel burnt in a chafing-dish or brasier, or any other contrivance by which the whole of the vapour arising from the burning fuel is not entirely carried off.

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Moreover, if the fuel be burned in a stove or furnace in the middle of the room, or any where where the vapour arising from such metallic substances is not entirely carried off, two mischiefs will arise. In the first place, a calcination of the metal will destroy the pure air, and leave the atmosphere, which the patient is to breathe, with a less proportion of it; by consequence, will render it necessary for the patient to make more frequent and fuller respirations, in order to take the same quantity of pure air into his lungs; it is therefore necessary that no such apparatus be used. In the second place, it often happens that noxious vapours arise from metallic stoves, in which fuel is burnt, which are pernicious. If, however, a stove or furnace, containing the burning fuel, is constructed of porcelain, or any other substance not altered by heat, neither of these causes of mischief will arise. If the outside of any such stove was to be heated to a much greater degree than that of boiling water, then indeed the particles of animal and vegetable matter, which often

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float about the room, falling upon the surface of a stove, would be rendered empyreumatic; would burn, and so contaminate the air as to render it noxious when respired. The author does not otherwise see any objection to heating the air of the bed-chamber when necessary, by a stove or furnace, not apt to be at all decomposed or altered by heat, if the heat of the external surface of such stove or furnace is always kept under the heat of boiling water.

If the chamber be kept heated by fuel burning in a grate, or open fire-place, where all the air serving for the burning of the fuel, together with all the vapour arising from the burning fuel itself, is carried off by a chimney; there certainly can no objection arise from the diminution of pure air in the atmosphere, or from noxious matters thrown into it. The only question with regard to the heat produced in this way is, whether it be diffused perfectly equally all over the chamber of the patient, or at least over that part of it in which the patient is. If it be so
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equally diffused, no mischief can arise; but if cold air should be drawn into the room, in such manner as to pass over the patient, then indeed this mode of heating the room would have all the bad effects that have been above enumerated, as arising from the patient being exposed to too cold an atmosphere. Attention should therefore be paid, in this case, that no stream of cold air be allowed to pass over the patient.

These are the means which have been practised to heat the atmosphere surrounding the patient by burning fuel. The author is not acquainted with any means of generating heat in the patient's bed-chamber preferable to burning fuel.

The next means of keeping the patient in a proper degree of heat, are the modes of heating the substances immediately surrounding the body, as well as the air of the atmosphere. For this purpose, it is much better that a patient should be kept in bed, where the heat is more equally diffused all over his body, than when he is in the ordi-

nary cloathing he wears when out of bed. There are other more cogent reasons for keeping him in bed in fever, which will be afterwards enumerated. Supposing, then, that a patient should be seized with fever, and that he is immediately to be put to bed; if the bed itself is not perfectly dry, it should be dried and heated before a large fire, and clean sheets are to be laid upon it, which are also to be properly warmed, as are the other coverings. The bed should by no means be heated by any hot substance, such as a warming-pan, which, if there be any moisture about the bed or bed-cloaths, raises that moisture, which does a great deal of mischief to the patient, as will afterwards be explained.

After the patient is in bed, the heat of the bed-cloaths, or substances immediately surrounding him, can only be kept up by the heat generated by the patient himself. All that can be further done, if it be necessary from the heat of the external atmosphere to warm them, is, that they should be kept warmer, by forming them of substances
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which communicate heat with difficulty, and therefore confine the heat generated by the patient. It is likewise necessary that the strength of the patient should not be exhausted by exertion. In the first place, the bed which is under the patient should be of soft feathers, which were better loosely quilted, that they may be firm enough to give support without giving way, and at the same time sufficiently loose to be very bad conductors of heat.

The author must here remark, that he is giving the best directions, as far as his judgment goes, knowing at the same time that they cannot be always perfectly complied with. Yet it is necessary that the best should be known, so that they may be come as near to as possible. Some have thought that the bed had better be a mattraß, formed of wool or hair, firmly quilted. This the author conceives to be part of that superstition, which inclines men in health to believe, that it is a meritorious act to give themselves pain.

In fever, the body should certainly be supported by substances, which make its own weight less disagreeable to the patient. Although this observation belongs to another attention during fever, what is now treated of being only the heat surrounding substances. Under the circumstances at present under consideration, the heat is not to be lost by the patient's being laid upon good conductors of it. Upon these general principles the following directions are laid down. The covering over the patient ought to add to the quality of not conducting heat readily, that of being of very little weight. The immediate covering of the patient should be cotton cloth; that is, his shirt and sheets, as being less apt to conduct heat than linen. The author mentions, in the first instance, that which is the best without regard to expence. Therefore, an eider down covering, quilted in some thin material, is the best. Nevertheless, although certainly pressure of bed-cloaths ought to be avoided, as supporting that pressure is an exertion of the powers of the body, there is something

thing in the habit of bearing pressure greater than such slight covering, which the author is not sure might not counteract the convenience of its lightness. At any rate the covering which goes over the sheets should be, where it can be had, of the newest and lightest woollen cloths, such as are called blankets; for the wool of animals is so constructed, as, upon being pressed together frequently, to weave itself into a thick and heavy substance, called felt, which would by no means be a proper covering for a patient affected with fever.

All kinds of cloaths, when moistened with any watery fluid, become much better conductors of heat than when they are perfectly dry. For this reason, if, from the exudations from the patient himself, or in any other way, they should become moist, they ought to be removed, and fresh and dry coverings be substituted in their room. Another reason for removing any of the coverings of the patient when moist is, that the evaporation of the moisture produces cold, and that cold is apt to be transmitted

to the patient, and to produce the mischief which has already been said to arise from his body's being exposed to too great a degree of cold. The cold thus produced is also apt to act more forceably upon particular parts of the body, which have not usually been accustomed to exposure to cold, and therefore is much more hurtful.

Hitherto means have been proposed to prevent the patient's being too much exposed to cold, either of the air of the atmosphere, or of the solid substances surrounding him. The next thing to be taken notice of is, how to avoid too great a degree of heat, either in the atmosphere, or of the solid substances surrounding the patient. This indeed is a matter of much greater difficulty to give directions about, and especially to the author, who has always practised in temperate and cold countries, particularly as few or no attempts have been made in warmer climates to give coolness to the atmosphere, and substances surrounding the patient. He can therefore only conjecture by what means this object may be obtained.

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In the climate of England, the atmosphere is sometimes heated to a greater degree than is convenient in fevers, as has already been shewn. The only way of cooling it that can at all be put in practice is, by the evaporation of watery fluids, which may be produced by sprinkling water upon the floor, and other parts of the bed-chamber of the patient. But then there is danger of the evaporation producing at times too great a degree of cold, or partial cold; the effects of this are somewhat obviated by using, instead of pure water, water impregnated with essential oil of aromatic plants. The author, however, has not much dependence on this, although it feels very refreshing to the patient.

Whenever the patient is in a climate, whose heat is less than ninety-seven degrees of Fahrenheit's thermometer, which is nearly the heat of the body of the patient, removing the air which is in immediate contact, by means of putting the atmosphere in motion by any kind of fan, renders that which is in immediate contact with the
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body much colder than it would otherwise be. Such means, in case of too warm an atmosphere, seem to be very proper to be employed.

It is a question, whether exposure to a stream of air colder than the heat of the human body would be safe. Certainly if that stream of air contains moisture it would do mischief, in consequence of the particles of water, which were before suspended in the air, being dissolved in it by the superior heat of the body itself, and thus producing cold in too great a degree. If the air passing over the patient, under these circumstances, had no water suspended in it, in this case, the author does not apprehend any mischief, excepting there was moisture immediately covering the skin, which being dissolved in such dry air, might produce too great a degree of cold.

The solid substances covering the patient, in case of his being in too warm an atmosphere, ought to be thin; but still, however, bad conductors of heat, such as cotton wove
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thin; for if these should happen to get moist, if they were good conductors of heat, the cold generated by the solution of such moisture in the air, being immediately applied to the patient, might do a great deal of mischief, as has already been explained.

In fever, a patient should avoid all extraordinary exertions; he should be placed, therefore, in a horizontal position, or as nearly so as he is accustomed to when in health; in this position he is supported every where by the bed, and is not obliged to exert any of his muscles, as he is when in an upright posture, to keep the parts in equilibrium. At the same time, great care should be taken, that his mind be kept free from all exertions whatever, and especially all such as produce any anxiety.

In regular continued fever, when severe, the patient is not able to judge of any thing truly; the mind cannot arrange the arguments on each side of a question, so as to draw from them any perfect conclusion, much less can it form a rule for any action; nor, when it has
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formed an opinion of what is to be done, can it imagine the mode in which the effect is to be produced. No advantage can, therefore, be gained, by exciting his attention to his affairs; the force of the system is only exhausted by fruitless attempts. If a regular continued fever should be less violent in its beginning, although a man might attend to his affairs with some effect, yet any advantage gained by such attention would be much overbalanced by exerting the force of the system. As soon, therefore, as a patient is seized with a febrile attack, he should immediately be put to bed, and left under the care of one attendant only, and every thing that can call into action the operations of the mind is to be avoided.

It might be conceived, that the practitioner who was called in to attend the patient, need not be warned to avoid exciting anxiety in the mind of the patient about his disease; it is necessary, however, as there are many practitioners, who, from inattention, make the disease the subject of their conversation in the hearing of the patient.

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It has even been affirmed, by those who wish to vilify medicine, that there are practitioners who, out of a point of vanity, talk learnedly to the patient about his disease; and that there are some who have even wished, by alarming the patient, to fix the disease, and prevent it from being carried off. That this is true the author can hardly believe; he only intends to warn all practitioners not to disturb the mind of a patient; indeed at any time in disease, but more particularly in fever.

The patient being laid in bed, in nearly an horizontal posture, with a proper degree of heat and covering, the next thing to be attended to is, the quality of the atmosphere which he breathes, and which surrounds him.

It is necessary, as has already been observed, that a man should take into his lungs a certain quantity of a vapour, called pure air, which has a certain effect on the system necessary for life. This vapour does not sensibly affect the matter of the body,

excepting that it adds yellow to the red particles of the blood, which is so altered in the the circulation through the body, that it must pass through the lungs, and from them again into the other parts of the body, in order that a man should exist. This vapour makes about a fourth part of the atmosphere. The whole atmosphere is so mixed together, by the currents which are constantly taking place in it, that pure air is found nearly in equal proportions in almost all situations where the atmosphere does not stagnate; in a room in a private house, or in the ward of an hospital in the centre of such a city as London; in a cultivated or uncultivated country, over the sea, or in any situation where currents of the atmosphere are constantly taking place. In order, therefore, to keep up the due proportion of pure air in the bed-chamber of a patient, it is only necessary that the air should not stagnate.

The next thing to be considered is, whether a different proportion of pure air would be better adapted to the respiration of a patient

patient in a fever, than that proportion which is found commonly in the atmosphere.

It is but lately that the proportion of pure air to the other vapours contained in the atmosphere has been found out; it having been long known, however, that there were various other vapours mixed with it in the atmosphere.

Whenever any new and seemingly important fact has been discovered, and especially if it cannot immediately be applied to any advantageous purpose in mechanical or chemical arts, mankind in general, and very often even practitioners in medicine, conceive it must be applicable to some medicinal purpose. Just as an infant, allured by any thing which glitters in its eye, applies it to its mouth, supposing it must be likewise exquisite food; so infants in medicine are dazzled with any surprising discovery, and immediately employ it for the cure of diseases, not considering how extremely difficult an art medicine is; how fallacious experiments made in it often are, as has been observed
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long ago by Hippocrates, and by what flow degrees valuable medicines have had their powers investigated ; how long it was before the effects of the bark of the cinchona, of mercury, of antimony, were brought to light, as far as they are already known.

The author, therefore, conceives, that in fever it certainly is not at all known, whether the fever will go through its ordinary course better or worse for the patient's breathing an atmosphere having a larger or less proportion of pure air. The other vapours which constitute the remaining three-fourths of the atmosphere, may some of them be noxious, and others of them may be breathed along with the proper proportion of pure air, without any detriment.

As the vapours which constitute the atmosphere are extremely viscid, they suspend innumerable fine particles of various solids, and also innumerable drops of fluids, which are principally water, the effects of which last have already been attended to. Many such substances

substances may be very noxious and very improper for the patient to breathe in health, and still more noxious in disease. That they are very noxious in many diseases is easily seen from what happens in hospitals, in almost all kinds of wounds and ulcers, inflammations and suppurations, in all affections of any of the parts employed in respiration. In all these diseases the patients in hospitals recover much more seldom than in the air even of London, a town at least seven miles long and three in breadth; and in such a town these diseases go on much worse than they do in the country at the distance of ten miles from it.

What are the noxious particles, or vapours, mixed with the atmosphere, which render it so hurtful in these diseases, has not been investigated. The breath arising from the lungs of animals, the vapours which arise from their bodies, the vapour arising from the immense quantity of matter which is constantly putrefying, the vapour which has served for the inflammation of fuel, &c. are all improper for respiration. The par-

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ticles of soot, ashes, horse-dung, gravel, and a vast variety of other bodies, floating in the air of a large town, render it undoubtedly improper for respiration; but which of all these small particles, vapours, fluids, or solids, are hurtful in the diseases which have been enumerated, has by no means been investigated by experiment, the only means of investigation which can in the least be depended upon.

However noxious these vapours, which ordinarily contaminate the atmosphere of an hospital, or large town, are in the diseases which have been enumerated, they do not seem to have very bad effects in a regular continued fever. A patient, in a regular continued fever, goes through its course under exactly the same treatment, as safely in St. Thomas's hospital as he does in the country, or in an air in which no noxious particles are known to exist. It is undoubtedly true, that vapour arising from putrid substances depresses the strength, and in so far must be noxious in fever; but when care is taken to avoid such putrefaction,
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and by a proper circulation to keep a due proportion of pure air; infectious vapour, and most other noxious substances, do not seem, from experience, to have much effect in regular continued fever.

Two things must be observed, therefore, in regulating the air of the room in which the patient is confined in such a fever. First, that there shall be such a circulation of the air, or, in other words, such a quantity of air shall enter the room and pass out of it, as is sufficient to keep up the proper proportion of pure air. This must be done in such a manner, as that the fresh air passing in shall not flow in a stream over the bed of the patient, lest it do mischief by its temperature. Secondly, it is necessary that the air shall not be contaminated by putrescent matters. It is much better then that the food, and whatever else is necessary for the patient, should be prepared in an adjacent chamber to that in which he lies, and only the attendant upon the patient should be suffered to remain in his room.

A regular continued fever, if it be left to pursue its own course, continues, as has already been said, for between two and three weeks, if the patient is not lost or if no crisis takes place. A man cannot live for so long a time without some nourishment; it is therefore necessary, in the next place, to enquire what food and drink should be employed during the progress of the disease.

In the first place it is to be observed, that in a regular continued fever there is no time in which the patient is free from the disease, as there is in a regular tertian; those rules, therefore, which have been laid down as proper to be followed in a regular tertian, are by no means applicable in a regular continued fever.

In a regular continued fever no principal meal can ever be employed, as the organs of digestion are always too much deranged to be capable of converting into chyle and blood a large quantity of food of any kind. On the other hand, there is this great difficulty in the ordinary state of the
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body in health, that in man, any interruption to the process of digestion, arising from fresh matter being thrown into the stomach, always interrupts the process, so as to render it much more imperfect, and often induces disorder of the whole system. This is not the case in all animals; a horse is constantly throwing in fresh matter, and the processes are going on notwithstanding very perfectly.

A man is often so far deranged in fever, as to render it in many things necessary to deviate from his ordinary modes of life in health. In a regular continued fever, for instance, the food cannot be thrown into the stomach in great quantity at once, without greatly disordering the whole system, increasing the disease, and rendering it irregular; small quantities only of food must, therefore, be thrown in at a time, and that must be often repeated.

In a regular continued fever, be it ever so slight, no solid animal food ought ever to be employed, whether quadrupeds, birds, reptiles, or insects. Solid animal food, in a

regular continued fever, during its digestion, greatly increases the heat to the feel of the patient, still more to the feel of the bystander, and frequently, though not always, to the thermometer. It produces great restlessness and sense of uneasiness, and an increase of depression of strength in the patient, during the time that it remains in the stomach and intestines. It totally deranges the fever. It often produces the appearance of a fresh paroxysm. If it be made use of about noon, or before the next evening exacerbation, this is almost always rendered more violent. It is true, indeed, that if an error be committed, and solid animal food be employed, after it has passed through the intestinal canals, the system generally recovers itself, the patient only being weakened by the extraordinary exertion, and rendered less able to support himself during the remainder of the disease. If the same kind of food be persisted in, it increases the evening exacerbations extremely, brings on delirium much faster, and in a much greater degree than it would otherwise arise, and prevents the fever from being worn out by its own progress,

progress, as it otherwise would be. All solid animal food is therefore in every case to be rejected throughout the whole progress of the disease.

Even after the disease has been terminated by a crisis, animal food, in a solid state, should be rejected, there being no cause which has produced relapses, as far as the author's observation has gone, so frequently as using solid animal food too soon. Supposing even a complete crisis should have taken place, and entirely terminated the disease, it ought to be at least five or six days before any solid animal food is ventured upon.

The author wishes to press this more strongly; because if a perfect crisis should take place, the appetite often returns, and the patient is left in a very weak state. It has, in this case, been often conceived by the patient, and much more frequently by the bystanders, that solid animal food would restore his strength soon. It must, however, be remembered, that when a

complete crisis takes place, and carries off the fever entirely, the depression of strength, which was a symptom of the fever, ceases, and the weakness, which was produced by the exertions and derangement of all the faculties in the system, is no longer increasing, and that the patient, with very moderate nourishment, and the sleep and rest which are so apt to ensue after the fever has been completely carried off, will have his strength restored in a very short time, without using any thing that shall run any risk of re-producing the disease.

The same objections arise against the use of such animal fluids as are coagulated by the coagulating juice of the stomach; such as serum, eggs, and other fluids of the same kind. These become solid as soon as they are thrown into the stomach, and have the same effects in disturbing the whole system, during their digestion, as have been just enumerated to be produced by solid animal food. Milk is a fluid of this kind, being coagulated by the coagulating juice of the stomach as soon as thrown into it.

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We find, that it has been reprobated by Hippocrates, and many other practitioners. This subject, however, will be considered more fully hereafter.

All such vegetable substances, as cabbage, lettuce, green pease, and the like, are to be rejected, on account of their disposition to run into the vinous and acetous fermentations, which the stomach, having its powers depressed by the fever, is not strong enough to counteract. Neither is it able to induce those fermentations which convert the food into chyle. Chyle is therefore not formed from such food, but a considerable quantity of vapour is extricated during the time these substances remain in the stomach and intestines, distending them, and producing spasmodic contractions in them.

In the beginning of a regular continued fever no very great nourishment is required for the present, the system being able to support itself for a time, without any thing being thrown in to be formed into chyle and blood. For in a man in health, what-
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ever quantity of food is thrown in, a certain part of it only is converted into blood. The remainder is either converted principally into water, and thrown out of the body, or into expressed oil, and deposited in the cellular membrane, or what is by some called the adipose membrane. Hence we see that where food can always be had in plenty, and the appetite is such as provokes a person to employ a great deal more food than what is capable of maintaining the proper quantity of blood, if the superfluous quantity of chyle be converted into water, and evacuated, the person remains thin. If, on the other hand, a great part of the superfluous quantity of food is converted into expressed oil, a great quantity of fat is accumulated in almost every part of the body. When more food is used than what is necessary for keeping up the proper quantity of blood, there is always some quantity of expressed oil, and perhaps some other substances formed in the body. These are laid up, as it were, in a reservoir, are absorbed, brought into the circulation again; are converted into blood, and supply
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in a degree the want of proper nourishment.

By what process they are converted into blood is not at all known; but that they are is evident, in as much as a person strong and well nourished does not lose his fluids, and become so emaciated in fever, and in many other diseases, as if he had had less blood in his blood-vessels, and less fat, &c. when the disease first took place.

It has already been remarked, that when more food is made use of than what is sufficient to keep up the quantity of blood in the system, the superfluous quantity is otherwise disposed of. So when a great quantity of expressed oil is deposited in the cellular membrane, it does not supply the place of food better than if a moderate quantity had been so deposited, the powers of the body not being able to make above a certain quantity of expressed oil into blood. Or, in other words, it may be said, that although a man, with a moderate quantity of expressed oil, that is, moderately fat, can undoubt.

undoubtedly support himself in a fever, better than a man who was emaciated when the disease took place, yet a man with a very large quantity of expressed oil is hurt by the absorption, it being increased in consequence of the fever. The power of the system is oppressed by the quantity of expressed oil absorbed, which cannot be converted into blood, and must be converted into water, to be thrown out of the body.

When therefore a man is in a proper state of nourishment when a fever begins, if there is in his body matter which may in part supply the loss of the blood during its progress, it is not proper to disturb the system by exhibiting any kind of food liable to produce this effect in the first days of the disease.

If it could be foreseen when a fever begins, as it may be in many cases, that it would be converted into a regular intermittent in a few days, it would not be necessary to derange the system, by exhibiting any kind of food that might produce any disorder

order in it, such derangement preventing perfect intermissions from taking place. But if it be known, from the rules that have already been laid down, that the disease is more likely to be a continued fever, although no nourishment is wanted immediately, there will afterwards come a time when a much greater quantity of nourishment will be required. The derangement of the organs of digestion is not so great in the first days of the disease, as it comes to be afterwards; so that upon the whole, considering what may happen afterwards, that is to say, how much nourishment will be wanted, it is better not to let the patient sink, but give him as much food, and such food, from the beginning, as will not produce any disturbances from its quantity or quality.

Every kind of food which is adhesive to the stomach when it gets into it, produces considerable disturbances in the system during the time it remains in the stomach; such as strong solution of gum arabic, jellies formed from the meat of young animals, or from the membraneous parts of animals

dissolved in water; such substances, therefore, should be avoided. Farinaceous matter, coagulated by heat, and afterwards dissolved in water, forms a food which gives indeed moderate nourishment, but then it is not adhesive to the stomach, does not produce any disturbance in the system in consequence of its solidity, nor is it apt to fall into the vinous and acetous fermentation, and is not therefore acedent or flatulent. Farinaceous vegetable food, if dissolved in water, without being first coagulated by heat, or otherwise, affords a very viscid solution, which adheres to the stomach, and produces great disturbances in the system. We see that the ancient Greek physicians were extremely careful to coagulate farinaceous matter before they exhibited it to their patients, either in a solid form, or dissolved in water, as their *panis biscoctus*, or bread twice baked, the coagulation not penetrating sufficiently through the whole of it on its first exposure to heat. On the same ground they broke down the farinaceous seeds of wheat, and other grains, into small particles, although not quite into flour,

flour, exposed them to heat in an oven until they were browned. So likewise barley water is prepared, by boiling in the first place the barley in water, till it be coagulated, throwing away that water, and then employing a fresh quantity of water, in which part of the barley is dissolved. Such a solution of farinaceous matter in water forms the simplest nourishment in fevers, and other acute diseases.

Solutions of farinaceous feed, thus formed, first by taking off the husks from the feed, then boiling the cotyledons or farinaceous parts in water, afterwards throwing away that water, and lastly adding more water, until part or a whole of the farinaceous matter is dissolved, forms that kind of nourishment which gives the least disturbance during its digestion.

It has been contended by many practitioners, that no other food should ever be employed in a regular continued fever, as they have thought that it is of much more consequence to avoid all disturbance,
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and consequent irregularity of the fever, than to give nourishment in a greater degree. Others, again, have thought it of consequence to give more nourishment.

The next preparation of farinaceous matter is made by forming it into a cake, baking it, and afterwards boiling it in water, until it is not quite dissolved, and so exhibiting it to the patient. Sago seems to be the farinaceous pith of some palm tree prepared in this manner.

The author, in his *Treatise on Digestion*, has shewn, by an accurate experiment, that the same quantity of the same food in a solid form, gives much greater nourishment than when it is dissolved in water; at the same time it is not improbable, that even when it is nearly dissolved, it is of somewhat more difficult digestion than when it is entirely dissolved.

Next to food prepared in the manner which has been already described, the cotyledons of farinaceous seeds, as of barley,
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for example, boiled in water, until they have become very soft, give somewhat a greater nourishment, and have been thought by many a food of quite as difficult digestion as ought ever to be employed in continued fevers. Bread twice baked, which in our language is called rusks, is nearly of the same degree of facility of digestion, and of the same nourishment. Farinaceous seeds, broken down into small particles, afterwards exposed to heat until they are brown, and given either in that state or boiled in water, appear to have been much employed by the ancient Greek physicians, although they are not now in use.

Fruits are of various qualities with regard to digestion and nourishment. Some of them contain a very considerable quantity of an acid, which is evidently capable of digestion, as it corrects the putrescency of animal food, which no other acid does. This shews that it enters into the fermentations of the stomach along with the animal food. This is a subject, however, which it would be improper to argue here,

as fruits, whose juices principally consist in this acid, such as lemons, do not afford nourishment enough to be depended upon in fevers.

Some fruits contain a mucilaginous substance, which is exceedingly apt to fall itself into fermentation, and produce in the sugar, which is found in some quantity in all fruits, the vinous and acetous fermentations, and induce these fermentations in the stomach. These are therefore flatulent and acedent, and of consequence cannot be employed with any propriety in this disease. Cherries, for example, are of this kind. Other fruits contain a great deal of sugar, and hence afford great nourishment, and but little of that mucilage which is so apt to fall into fermentations, are easy of digestion, and may therefore be employed in fever; the principal of these which are cultivated are grapes, figs, and dates, which are all of them agreeable to the stomach, and may be employed along with the preparations of farinaceous matter that have been above enumerated.

While in the recent form, however, the fruits last enumerated contain rather too large a quantity of essential oil to be agreeable to the stomach during the time of a regular continued fever, although the flavour of this essential oil is often very agreeable to a man in health in their recent form. They also contain more or less of a mucilaginous adhesive matter. By drying or exposing them to the heat of boiling water, the adhesive matter is coagulated, and loses its adhesiveness; the essential oil is in a great measure evaporated, and the objections arising from these of consequence got rid of. The mischief, however, arising from the flavour, and adhesive mucilage, is not so great as to prevent them from being employed when recent, if they be good of their kind, especially grapes, provided they be fully ripe.

Another class of fruits contain, besides native vegetable acid, fermentable mucilage, sugar, and generally a small proportion of an adhesive mucilage like gum, and a quantity of farinaceous matter; such as apples, pears, apricots, peaches, and nectarines. In the

tribe of apples there is a large proportion of farinaceous matter and adhesive mucilage; therefore apples and pears may be employed in regular continued fevers; but not unless they have had their mucilaginous substances coagulated by heat, which also destroys, in a great measure, the fermentable mucilage with which they likewise abound. Boiled, baked, or roasted, they may also be employed as food in a regular continued fever.

Peaches, and other fruits of the same kind, when they have been improved by cultivation, contain little else but farinaceous matter and sugar, and may therefore be employed without any previous preparation.

The fruits of the cucurbitaceæ, whether ripe or unripe, are very improper to be employed in regular continued fever, or indeed in any disease where it is necessary to employ food of easy digestion. They contain a mucilage, which falls into fermentations more difficultly than any substance that we know. They resist so strongly the fermentations which take place in the stomach, although

although they be of a loose and flabby texture, as to have remained in the stomach above three days, and to have been thrown up again undissolved and almost unaltered. Of this kind are cucumbers, melons, &c.

These are the vegetable substances employed for food, and the properties which render them fit or unfit to be made use of in regular continued fever, according to the degree of the disease. That is, in a very violent regular continued fever, at the beginning, if the patient be in perfect health and strength, and well nourished, nothing but solutions of farinaceous matter, coagulated by heat, should be given. If the fever is not so violent, although there appear to be no necessity for much nourishment for the present, yet as there will come a time afterwards, when the fever will be more violent, and affect the organs of digestion more, it is better to employ farinaceous matter coagulated, and nearly dissolved again in water, such as sago; or only somewhat softened again by the water, as barley boiled soft, &c. together with such fruits as have been above pointed out.

It has been a question, whether any animal food should ever be employed in regular continued fevers. Many practitioners have contended strongly, that no animal food should ever be given. Animal food, of any kind, is certainly much more apt to disagree with the stomach, to produce a great sense of heat throughout the system, and to render the pulse more frequent, than those vegetable substances which have been enumerated as proper to be employed in regular continued fever. Moreover men may live and be nourished, and their strength perfectly kept up, by vegetable food alone, even when they undergo great labour, or when they use violent exercise. If thus in health food of easy digestion is sufficient to maintain the powers of the body, it is certainly capable of maintaining them in disease, where from the facility of its digestion, a greater proportion of it will be converted into chyle, than of animal food of much more difficult digestion.

Whether it be ever proper for mankind to use animal food, is a question foreign from

from the present dissertation. The question at present to be agitated is, whether animal food should be employed by a patient afflicted with fever. The author is inclined to think, that it is never necessary or proper for the patient to use animal food of any kind in a regular continued fever. The habit of using animal food in large proportion to the whole in this country, England, has induced an idea, that a patient could not be sustained through a regular continued fever without using animal food. This prejudice is so strong, that it is impossible to prevent the attendants on the sick from giving them animal food. It must therefore be considered, what kind will produce the least disturbance in the system.

In the first place, no solid animal food should ever be exhibited to a patient affected with a regular continued fever. Solid animal food, even such as is of the easiest digestion, such as fowls, and white fish of a moderate degree of firmness, as whittings, has been the cause of the greatest

number of relapses when used after a crisis, or by a convalescent, that have come within the knowledge of the author. Of consequence, it must do much mischief during the time of a regular continued fever, by rendering the relaxations more imperfect, and the exacerbations more violent; it ought, therefore, to be by no means used, until the patient has got perfectly free from all appearances of the disease.

If animal food then is to be employed at all, it should be in solution in water. All solutions of animal food in water are not of the same kind. In the first place, there are certain solutions of animal food in water, which contain mucilaginous matter, which coagulates, that is to say, becomes insoluble in water, consequently solid as soon as it gets into the stomach. Such substances are as difficult of digestion as solid animal food, when they are thrown into the stomach, and ought therefore to be rejected; such as whites of eggs, serum of blood, &c. All such substances may be easily known, by heating them to the heat of boiling

boiling water, in which degree they also coagulate.

Milk is a fluid that always coagulates in the stomach, but does not coagulate in the heat of boiling water. It has been generally thought, that this fluid ought not to be made use of in continued fevers. In one part of the works of Hippocrates, it is said simply, that it is bad. In another part, that it ought not to be given, unless the fever is very long. Sometimes the author has seen it coagulate in the stomach so firmly, as to render the patient sick, which sickness brought on vomiting, during which the coagulum was thrown up resembling a tendon. In such cases milk is undoubtedly a very improper food.

Milk consists of a solution of a mucilaginous substance in water, expressed oil, and sugar; there is perhaps likewise a little of the neutral salts of the blood in it. The sugar contained in it corrects any putrescency that might take place in the chyle, rather disposing it to be acedent; and the
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expressed oil being every where mixed with it, prevents it, when it coagulates, from forming so firm a mass, so that although it be always coagulated in the stomachs of children, it digests easier than almost any kind of food, at the same time that it gives them greater nourishment. This would tempt us to employ it in fever, as an animal food of at least easy digestion; and the author is not certain that, notwithstanding it has been condemned by Hippocrates, and the few cases he has seen where it has disagreed with the stomach, that it is very fit to be employed if any animal food is given.

Of the solutions of animal mucilages in water, which are not coagulable by the juices of the stomach, there are none found commonly in animal bodies which give nourishment. They are made by dissolving the solid or coagulated fluids of animals in water by heat. These differ from each other, in forming with water a solution either more or less viscid or adhesive.

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It has already been observed, that every thing adhesive is of extremely difficult digestion, and at the same time produces great disorder in the system during the digestion. All such solutions of animal mucilage in water, as form with the water an adhesive compound, are therefore improper to be employed in fevers. Such are solutions of all parts of young animals, as veal, lamb, &c. and also the solutions of the membranous, tendinous, and ligamentous parts of all animals.

If we, therefore, employ any animal food at all in regular continued fevers, it should be solutions of the muscular parts of animals, which have attained their full growth, as of oxen, sheep, fowls, &c. In making solutions of parts of animals in water, which we call broths and soups, we extract a quantity of expressed oil, which is fluid in the heat of boiling water, generally solid in the heat of the atmosphere. This expressed oil contains the flavour of the animal, which depends probably on an essential oil diffused through the expressed oil. When the whole solution is set to cool, the expressed oil rises
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to the top, and as it cools becomes solid, and therefore may be easily strained off, carrying the flavour along with it, which should always be done before it be exhibited to the patient.

At the beginning of a regular continued fever, when it has attacked a patient in full vigour and well nourished, it is certainly improper to employ animal food in the first week of the disease; when it is given, it ought to be in small quantities at a time. These are the attentions to the nourishment during the continuance of a regular continued fever.

Thirst is often a very distressing symptom of fever: the opinions of practitioners have differed very much with regard to the quantity as well as quality of the fluid to be made use of for drink.

The ancient Greek physicians thought it improper that the patient should drink any thing at all during at least part of the disease, as they conceived that any kind of drink increased

increased the fever, and occasioned greater thirst, even water alone. Modern practitioners, with a view of rendering the blood thinner, have forced the patient to drink a much larger quantity of water, or watery fluids, than he would of his own accord.

That the blood is thick, and in consequence obstructs the small vessels in fever, was a doctrine formed by authors, who were not acquainted with the substances of which the blood consists. They did not know that its most essential parts are red particles, coagulable lymph, and serum; that there is besides these a solution of mucilaginous substance, similar to that which is formed where putrefaction has taken place, that there was a solution of natron muriatum, ammonia muriata, and ammonia phosphorata; besides other neutral and earthy salts; and that besides all these substances there is also water, not in a state of chemical combination with any substance, but diffused through them. There is, therefore, a larger quantity of water already in the

the blood-vessels than is necessary to dissolve or combine with any of them.

That it is true that there is water not chemically combined is shewn by this, that when the blood is exposed to some of the fine filters in the body, such as the pores of the skin or the kidneys, water is filtered off, sometimes perfectly pure; but filtration is a process which never separates two substances chemically combined; water then, so filtered off, is not in combination with any of the substances from whence it is filtered.

If more superfluous matter were thrown into the blood than is already in it, it would not render any of the parts of the blood thinner, or capable of passing through vessels it could not pass through before; the only effect of it would be, that when blood came to a vessel so small as not to let any other part of the blood pass through, the water would pass through, and leave the other parts of the blood behind. Throwing, therefore, a larger quantity of water into the blood-vessels would
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not thin any part of the blood that was too viscid, so as to make it pass through vessels that it could not pass through before on account of its viscosity. It is not necessary, therefore, to force the patient to drink more water than he chooses for the purpose of thinning the blood, as no such effect arises from throwing in a larger quantity.

There are many other arguments, by which it might be shewn, that drinking more water than the patient is naturally inclined to do, from his thirst, in no way alters the chemical properties of the blood; that is, those properties which distinguish the several parts of it from one another, or from any other substance; but what we have already urged appears perfectly sufficient.

As it is not necessary or useful to give a quantity of water greater than the patient chooses to drink, so on the other hand, the not giving a sufficient quantity, according to the thirst, seems to have arisen, as far as can be judged, from that superstition, which
has

induced mankind to refrain from things agreeable, to produce some salutary effect; just as men think they will go to heaven, by not eating animal food for two days in the week.

The author then conceives, that the patient should be allowed to drink as much as he desires.

Another question has been much agitated, whether the drink should be exhibited hot or cold.

The ancient Greek physicians exhibited water in fever, not only cooled to the heat of the atmosphere, but cooled to the freezing point; and they gave such cold water, to the quantity of a quart or two, to be drunk at once. The purpose for which such quantities of very cold water were exhibited, will be taken notice of afterwards. At present the ordinary food and drink of the patient are only treated of.

Some modern practitioners conceive, that cold fluids, thrown into the stomach, would
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render the blood thicker, and would make it produce obstruction. Cold undoubtedly increases the viscosity of all fluids; this is shewn by a cold fluid passing through a filter much slower than the same fluid when it is hot. The body is always kept nearly in the same degree of heat. Probably one of the uses of this equal heat is, that there shall be no alteration of the viscosity of the fluids, so as to affect the filtrations which are constantly taking place, and by which some of the most important functions are performed.

When cold water is thrown into the stomach, the power in the stomach itself of keeping its own temperature, in common with the other parts of the body, will prevent the heat of the blood in it from being rendered much less than the ordinary heat of the animal. The rapidity with which the blood passes through the vessels of the stomach, would hardly allow time for it to be affected much by the heat of water in the stomach. After a man has put his hand in water even as cold as the freez-

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ing point, the author has found blood taken from a vein of the arm not cooled to less than ninety degrees. If the blood was rendered so thick as to be capable of obstructing the vessels, it would be the vessels of the stomach itself that would be obstructed; but no mischief arises to the stomach when frozen watery fluids are thrown into it. Although thousands of the inhabitants of London are every day in the practice of eating ice, we find no mischief arise from throwing it into the stomach, either in health or in fever.

When a vein is opened, and blood flows from it into a basin, the coagulable lymph separates from the water by which it was dissolved, and becomes solid; but the coagulable lymph becomes solid equally, whether the blood be kept in the heat of the human body, or be heated only to the heat of thawing water, which is less; or to the heat of an hundred and thirty degrees of Fahrenheit's thermometer, which is more than it can ever be exposed to in the human body.

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There is therefore no reason to believe, that cold water thrown into the stomach, especially in such quantity as the patient chooses to drink, can make any alteration in the thickness of the blood, by its operation in the stomach.

The author, therefore, concludes, that as it is of no use to restrain the patient from drinking as much as he pleases, or to compel him to drink more than he chooses, so it is of no use to prevent him from drinking it of the degree of heat that he likes best.

The next thing to be inquired into is, the quality of the watery fluid that is used for drink in continued fevers.

Water is obtained without any artificial process, as it flows out of the bowels of the earth by springs; in which case it almost always contains some saline substances, most commonly natron muriatum, or magnesia vitriolata, or both; and likewise very often a vapour, which was called gas by

Van Helmont, who first discovered it; and since his time fixed air, and by many other names. When the water passes in a stream from the spring, exposed to the atmosphere, the gas evaporates, and the salts are decomposed; so that in a river, although it may be mixed with earthy matter, which disturbs its transparency, yet there is nothing chemically combined with it.

There is a mode of decomposition of salts, consisting of an acid and an alkali, called neutral, an acid and a metal called metallic salts, and an acid and an earth called earthy salts, which has been taken too little notice of by practitioners in medicine, although it is very often of great importance in the exhibition of medicines.

If a neutral, metallic, or earthy salt, be dissolved in barely as much water as will dissolve it, and exposed to the air, no change will take place; but if this saturated solution be diluted with a considerable quantity of spring, river, or rain water, on standing exposed to the air, the salts will be decomposed:

posed: the neutral salts will first have their alkali converted into magnesia, and afterwards the acid will be lost, and the magnesia fall to the bottom. In metallic salts, the metal falls to the bottom in a calx, that is combined with pure air, and that calx is sometimes combined with gas. In earthy salts the acid will also be lost, and the earth will fall to the bottom. An easy experiment shews this. Make a saturated solution of cuprum vitriolatum in water, and let it stand in a wine glass exposed to the air of the atmosphere; it will remain perfectly clear and transparent; but if we put a drop of this solution into a wine glass holding two ounces, full of water, the liquor will be at first perfectly transparent; but in less than a minute it will begin to grow opaque, and in less than an hour will fall to the bottom, in the form of a blue calx. This explains what happens in mineral waters; the neutral, metallic, and earthy salts contained in them, are decomposed when they are but in small proportion to the water, on being exposed to the air of the atmosphere. In like manner, if we dissolve a grain of tar-

tartarized antimony in an ounce of spring, river, or rain water, with a view of giving a quarter of an ounce, and of consequence a quarter of a grain of tartarized antimony, at the end of every six hours. The first quarter of an ounce may contain a quarter of a grain of tartarized antimony; the second quarter of an ounce less; the third quarter of an ounce still less, and the last quarter of an ounce contains almost none at all.

To return from this digression; a person accustomed to any stimulus, applied to the organs of the senses, feels an uneasiness if that stimulus be removed, such as a man feels when the light he has been accustomed to is removed; so pure water, applied to the palate, is insipid, and gives that disagreeable sensation which has been called mawkishness. Thus the inhabitants of London are fonder of water issuing out of the earth by springs, which contains magnesia vitriolata, and natron muriatum, and gas, than distilled water; and from being
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accustomed to the former, feel distilled or pure water disagreeable to the taste.

It seldom happens that a solution of any saline substance, which is not disagreeable to the taste from the salt contained, can do any mischief to a patient affected with regular continued fever, and therefore whether he drinks pure water alone, or water combined with such salts, and such a quantity of gas as are commonly combined with it in springs, is of no consequence.

It has often happened that water has been impregnated with the essential oils of some of that class of plants, which in Linnaeus's system are called *didynamia gymnospermia*, such as sage, balm, &c. and exhibited for drink in fevers.

This practice has arisen from an hypothesis, that increasing the hot fit of fever by stimulants would tend to produce a crisis. Although this hypothesis was considered by Sydenham, in this country, as not true, and is given up by practitioners of knowledge in medicine, the practice of

giving these infusions has, notwithstanding, continued from mere habit. This practice seldom does mischief, but is of no manner of use.

Weak vinous fluids are in a state of fermentation; and as substances in a state of fermentation are apt to excite any other fermentation that the same substances are capable of, are perhaps useful to excite in the stomach the fermentations by which the food is converted into chyle, they are therefore so far perhaps better than pure water. Sydenham accordingly recommends small beer, a weak vinous fluid, formed from an infusion of malt, provided it be perfectly in the vinous state, as a drink proper to be employed in continued fever.

Solutions of farinaceous substances, after they are coagulated, such as barley water, have not only the advantage of making the superfluous water of the blood remain longer in the blood-vessels, so as to carry off more effectually the superfluous saline substances,
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and putrescent mucilage of the blood, but likewise afford nourishment of very easy digestion, and are therefore very useful as drink in all fevers in which such nourishment is required. They may be rendered more palatable by mixing a little acid from any vegetable, such as lemons or oranges, and if it should be more agreeable to the patient a little sugar, which also tends to give nourishment.

When a man is seized with fever, it often happens that before the moment of the fever taking place, he felt himself in perfect health. It may happen, therefore, that just before the fever came on, he may have eaten a considerable quantity of food, which of course would not be digested, converted into chyle, and pass into the blood-vessels; nor would it any how else be emptied out of the primæ viæ; and the powers of digestion being lessened, as well as the other powers of the body, the food would remain in the stomach undigested. When food remains in the stomach or intestines undigested, it either goes through the vi-

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nous and acetous fermentations, or putrefies, and in both cases occasions great disturbance in the system. It produces sometimes uneasiness about the stomach itself, and at first a sense of coldness generally all over the body; afterwards a sense of heat, or heat without any preceding coldness; a feel of fullness in the abdomen, flatulency, frequency of pulse, pain in the forehead, sometimes sickness, and sometimes cutaneous eruptions, or even inflammation about the head. All these derangements ought to be avoided in fever. The readiest mode of getting clear of these mischiefs is, to employ an emetic to evacuate such substances out of the stomach. If such undigested food should have got into the duodenum or jejunum, an emetic will evacuate these likewise, as is evident from its bringing up a quantity of bile, which never gets into the stomach in the healthy state of the body. Supposing that no food has been thrown into the stomach for many hours before the fever begins, so that all that has already been thrown in has digested, and the stomach and intestines have been cleared of it entirely, even
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in this case most practitioners have considered it as necessary to exhibit an emetic. Perhaps it may be, that something like the same crust that is formed on the tongue, may also be formed upon the surface of the stomach, and be evacuated by the emetic; or whether it be by some other effect of the emetic, the patient is relieved by it so much, as to have induced all practitioners to recommend it at the beginning of fever, or even five or six days after the fever has begun, supposing an emetic has not before been given.

It may be doubted whether the emetic produces relief in all cases, by evacuating something noxious out of the body, or whether the action of the emetic may not give relief to the patient in some other way. This is a question which will be agitated hereafter, when at the same time the quality of the emetic and the mode of exhibiting it will be treated of.

Among the powers of the body which are depressed by fever, the peristaltic motion
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of the intestines is one. The intestines, therefore, do not carry down the undigested part of the food, nor the bile, pancreatic juice, nor other substances secreted in them. Any of these substances remaining in the bowels produce a sense of fulness, weight, and uneasiness and restlessness in every part of the body, and augment the fever very considerably. It becomes necessary on this account to employ some laxative to keep up the peristaltic motion of the intestines, and produce an evacuation every twenty-four hours. At the beginning of a fever there may be undigested food in the intestines, while the patient is sufficiently strong to be able to bear a larger evacuation than afterwards. In this case it is not of much consequence what laxative is employed. But after the fever has gone on for some time, especially if the strength of the patient be reduced, the practitioner should never employ laxatives, which are uncertain in their operation, lest by too large an evacuation taking place, the patient should be very materially hurt.

Purgatives

Purgatives are very far from having one quality in all of them; some act, for example, in much less time than others. Such purgatives as neutral salts, or such salts as contain magnesia combined with an acid, increase the secretions from the intestines, and operate in an hour or two after their exhibition, and their effects are soon over. Others, as aloes and rhubarb, increase only the peristaltic motion of the intestines, and neither produce so copious an evacuation, nor are they so quick in producing their effects, not operating very often in less than ten or twelve hours.

Of these two species of purgatives, it may be proper to employ such as increase the secretions, and operate quickly for the first time, because the intestines will thus be quickly evacuated, and the substances contained in them not suffered to remain long enough to increase the fever or disorder it, provided the patient should have a sufficient degree of strength. If he should be very weak when attacked by the fever, the risk must not be run even at the beginning, when his strength
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is not at all exhausted by the fever, of exhibiting even one dose of such a purgative as neutral salts, &c. lest large evacuations should be produced by it, and the patient so reduced as never to have his strength recruited so as to be able to be supported during the disease.

If one dose of such a purgative as increases the secretions from the intestines, and produces quick evacuations, be exhibited at the beginning of the disease, it is improper to repeat it, because the want of appetite, and even loathing of food in the patient, prevent him from throwing down such substances as we want to evacuate very quickly, or wash off afterwards. It is much better to employ such purgatives as increase the peristaltic motion only; for this purpose cassia, manna, and other such laxatives, together with fenna, rhubarb, and sulphur, are to be employed. Although they are longer in their operation, and perhaps even give a little more pain to the patient, their effects are much more limited, so that they run little risk of weakening by too copious an evacuation; they also clear the intestines

more certainly of what is wanted to be got rid of.

It may be said, that we might fix on some laxative which is preferable, and ought always to be employed, this way being much more simple and determinate. It is to be observed, however, in the first place, that the constitutions of different patients are often different from each other, and substances applied to different men have different effects; so that if one laxative happens not to produce sufficient effect in its ordinary course, it may be supplied by another which can. Moreover, in one situation one laxative may be procured, when another of the same kind cannot. But the principal ground on which it is necessary to enumerate various laxatives is, the advantage that arises of mixing several of them together. When one laxative is employed alone, and in a sufficient dose, it is apt to produce sickness, pain in the bowels, and is uncertain in the degree of its operation. When several laxatives are mixed together, they are much less apt to produce sickness

ness or pain, and are much more certain in their operation.

This observation is applicable to a variety of different classes of medicine; but it would be much too great a deviation to enter into any discussion of this subject here.

Certain purgatives not only affect the stomach and intestines singly, but also produce considerable effects on the whole system. They render the pulse frequent, for instance, such are jalap, scammony, and many others; it would be certainly improper to employ any of these to act as laxatives in fever.

When the patient has gone through the first week of the fever, his strength begins to fail, in so far as that any great evacuation might bring him so low, that he could not afterwards be easily supported through the remainder of the disease. It is therefore a question, whether it is proper, after the first week, to give him a laxative by the mouth.

It happens unfortunately, that medicines do not operate precisely in the same manner and in the same degree, every time they are exhibited, although in the same dose, and under circumstances perfectly similar, as far as can be judged. The same purgative, or mixture of purgatives, exhibited to the same person in health at the distance of a week, when such person appears to be exactly in the same state in all circumstances, will operate often very differently, hardly ever exactly in the same manner. At the first exhibition it shall purge four or five times, with or without much pain; at the second perhaps twice, and with the reverse proportion of pain; or it shall purge the first time only twice, and the second time three or four times. The action, therefore, of such purgatives is very far from being constantly the same. It is to be remembered, that it is stated that the doses are given at least with the interval of a week; if two equal doses of the same purgative be exhibited to the same person with a day's interval, the first dose generally purges much more than the second.

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A laxative medicine thrown into the stomach after the first week of the disease, although given in the same dose which before produced one evacuation in twenty-four hours, may now therefore produce five or six, and may by this means diminish the powers of the system too much, and is therefore to be exhibited with great caution.

If there were no other mode of evacuating feculent matter which has been accumulated, the mischief arising from it is such, that a laxative must be employed, although certainly with caution.

There is, however, another mode of applying purgative or laxative remedies, so as to affect the intestines, encrease their peristaltic motion, and occasion their contents to be evacuated, and even increase the secretions from them.

If purgative medicines are injected into the rectum only, or with such force as to throw them up also into the colon, they will operate so as to occasion any feculent
matter

matter then to be evacuated. This mode of applying purgatives or laxatives, differs only from the former in the degree of their operation, and is said to be by glyster.

The question to be here agitated is, whether it may be better or safer to employ purgatives or laxatives in the latter part of fever, to keep the intestinal canal clear of feculent matter in this way, or by the mouth.

As purgatives thrown into the stomach, and passing from thence into the intestinal canal, are immediately applied to the excretory ducts of all the glands of the intestines, they of course stimulate all these glands; if they act by stimulating the glands; and by thus producing a flow of fluids in every part, wash the whole canal clean from beginning to end, and are so far preferable.

Since such purgatives likewise as tend to increase the peristaltic motion of the intestines, when thrown into the stomach, are applied to the whole internal coat, as they pass along they increase the peristaltic motion through the

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whole, and so empty the intestines completely.

Purgatives, therefore, thrown into the stomach, clear the whole intestinal canal better than glysters.

In the beginning of fevers the food that was not digested remains in the upper part of the intestines, and therefore at the beginning of regular continued fevers, on this ground, it is better to give purgatives by the mouth.

When purgatives are thrown into the rectum and colon, as they perhaps never rise above the colon, it is a question whether their influence, as acting on the rectum or colon, extends to the ileon, or higher; whether therefore they can clear the upper parts of the intestines.

For the present purpose this need not be argued; for after a fever has continued a week, and is regular, if purgative medicines by the mouth have been given to clear the upper part in that week, little food, and
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that only of the easiest digestion, being employed afterwards, all that is required is to keep the lower parts clear of the recrementitious parts of that food, and of the fluids secreted in the intestines. Glysters therefore, after the first week of the disease, seem sufficient to evacuate any noxious matter that may be in the intestines.

It is true that it may often happen, and actually does often happen, that during the first week of a continued fever, the practitioner who has attended to the patient has not thought of the state of the *primæ viæ*, but left the patient without one evacuation from the intestines for several days; and that this costiveness continues, or a purging arises from the feculent matter having putrefied, or otherwise become stimulating. In this case purgatives or laxatives must be thrown into the stomach; but such cases will be treated of more fully in the dissertations on irregular fever.

Glysters have this difference in their action from purgatives, that they are not near

so apt to produce a number of very loose evacuations, and so weaken the patient. As therefore they are sufficient to keep the primæ viæ clear after the first week, they are preferable for the reasons above given.

Nearly the same substances used for laxatives given by the mouth may be used for glysters.

The vehicle should be some mucilaginous watery fluid, as solution of farinaceous matter in water. Solution of flower of oats, which we call water gruel, may be used. Decoction of mallows, &c. are also proper. Such mucilaginous substances are preferable to pure water, as they prevent the stimulus of the purgative from acting so immediately on the intestine, and so making the glyster be evacuated directly, without bringing the feculent matter along with it.

It would be too great a digression here to enter into the explanation of this subject; it is sufficient to say, that the effect is actually found to be so. For the same reason oil
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has also commonly been added to glysters. Oil has also the effect of smoothing the inside of the intestines, and allowing hard feculent matters to pass easily over them.

The purgatives to be used in glysters in regular continued fevers are manna, cassia, &c. ol. ricini, senna, &c. which do not stimulate the system. It is also much better to mix them together, as in the elect. sen. comp. for the same reason as purgatives given by the mouth are better mixed.

In continued fevers, where glysters are merely used to keep the primæ viæ clear, neutral salts are not so applicable, because they are apt to induce a watery secretion from the intestine, which is not wanted, but is hurtful.

If after the first week of a continued fever the patient should have had no evacuation from the intestines for twenty-four hours, a glyster should be used about six or seven in the evening, that the feculent matters may be evacuated before the time of

sleep. This should be repeated every evening, when there has been no evacuation in the former part of the day.

If there should be two or three looser evacuations in the course of the day, it is also useful to employ glysters of mucilaginous fluids; but this will also be more properly considered among the irregularities which take place in the disease.

The sleep in fevers is prevented from being either so long or so sound as in health; the patient is of consequence very much weakened. It has been shewn also, that sleep occasions the cessation of all irregularities in the system, and therefore that it has a tendency to carry off fever, which is undoubtedly a very considerable irregularity. As the ordinary hours of sleep among mankind are generally the time of the greatest force of the hot fit in continued fevers, if it could be procured, especially before the time of the crisis or relaxation, which is about four in the morning, by its tendency to remove all disturbances in the system, it
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would assist the hot fit in carrying off the disease. It would therefore be of great consequence if sleep could be procured in fever, as the force of the living power would be recruited, crisis would be more apt to be produced, and all disturbances in the system would be got rid of.

After exercise, whether it be labour or for amusement, man is disposed to sleep. But in a fever the patient can neither labour nor employ exercise for his amusement : he ought undoubtedly to be kept as much at rest as possible both in his body and mind ; this method of procuring sleep, therefore, is quite out of the question in continued fever.

There are some things that induce mankind to sleep when the powers of the system are not at all exhausted. Perfect quietness of mind ; freedom from pain and uneasiness in the body ; no passion rousing to exertion, nor bodily pain drawing strongly his attention, and every thing that gives one constant and pleasant sensation lull the person

person to sleep. As an instance of the last, among some nations, gently pinching the skin. Gentle motion in the air from the waving of fans, the gentle and uniform noise of the flowing of water, or the wind rustling through trees, also lull a man to sleep. Such attention to uniform and agreeable objects can hardly be employed with efficacy, to release the mind from that anxiety which renders the patient restless in fever. Something of this kind the author once saw successful; the dropping of water, running slowly through a filter, into a basin of fluid placed below.

Opium is a medicine which has been known to produce sleep and give rest to those who are fatigued, probably as long as the effect of any medicine has been known. There is some medicine said to have been given by Helen to Telemachus to produce this effect. This indeed is the only medicine mentioned by Homer as having any effect when exhibited internally. Opium was certainly well known in the earliest ages in Greece. In many cases, as when a man is exhausted by labour or weakened
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by evacuations, it procures a quiet, easy, and refreshing sleep, if exhibited in the quantity of from half a grain to a grain. In regular continued fever, if exhibited in this quantity it often produces sleep, but that sleep is disturbed; the patient is often distracted with various incoherent and frequently disagreeable dreams; and he often wakes in the morning with a conviction that he has not slept at all. Instead of a relaxation of the fever taking place in the morning, the headach is greater, he has more thirst, the appetite is less: sleep, therefore, so procured is so far different from that rest which gives time for the powers of the body to be recruited, that they are more exhausted during it than they would have been if the patient had not slept at all. It is true, there are some cases in continued fevers in which such a restlessness from the opium is not produced, but a quiet, easy, refreshing sleep follows its exhibition; these are, when there are irregularities in the disease. Such cases will be described in a future dissertation.

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A great many substances have been mixed with opium to render the sleep procured by it more quiet and refreshing ; such as spices, acid of benzoen, preparations of antimony, antispasmodics, and many others ; but no mixture has as yet been found out, which renders such doses as have been described capable of producing easy and refreshing sleep in regular continued fevers.

About five and twenty years ago there arose a practice in St. Thomas's Hospital of exhibiting opium in a much less quantity, to wit, in the quantity of a quarter of a grain for a dose, and repeating it at the end of every six or eight hours. When given in such doses it produces no immediate effect, but by degrees the patient falls into a stupor which gradually increases ; and although this stupor does not end in a complete sleep, yet it grows in a day or two into that kind of stupor that we find, when the delirium from the fever, with apparent fulness of the vessels of the brain, begins to diminish. It is true, indeed, that this dose of opium is obtained by adding a few drops
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of laudanum to that mixture which is called mithridate, but the author has often employed the opium in his private practice, with ten grains of castor, with equal or rather better effect.

Lately many practitioners have exhibited opium three or four times in the twenty-four hours in fevers, having borrowed their practice probably from that which has been pursued in St. Thomas's Hospital, the practice of the Hospital being open to the inspection of many pupils. These practitioners have not learned however, that it is the smallness of the dose that produces beneficial effects ; if the dose be increased so far as half a grain, the same restlessness, the same disturbed sleep, dreams, &c. as have been noticed, are brought on.

Mithridate, Theriaca Andromachi, &c. contain an immense mixture of mucilaginous medicines, spices and astringents, with a small quantity of opium : this vast farrago renders their effects totally unintelligible, and they have therefore been thrown aside ; but
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many practitioners have given them up with great reluctance, especially old practitioners. It may be said; indeed, that a man who has been in the habit of exhibiting any medicine in a disease does not like to be disturbed in that habit, but it is not improbable that they have been led to continue the use of these, from the good effects arising from the exhibition of the small doses of opium they contain.

Whether such small doses of opium can with propriety be employed during the first week of the fever, has not been determined. The author has not ventured upon employing it, nor does he know that any other person has employed it during the first week of the disease.

It is a question whether it might be proper to employ it in the second week, notwithstanding there is delirium of either kind in a considerable degree. This question, however, seems to be determined by practice; in either case of delirium it would appear that it is proper, that it considerably
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abates the delirium, and especially that it takes off that violent increase of delirium of the first species which arises in the evening.

Opium is not the only medicine which has been employed with a view of procuring sleep. There are certain medicines which have been called antispasmodic, which have also been employed for the same purpose by many practitioners. An antispasmodic medicine is a medicine which takes off any contraction arising without an apparent cause, or continuing after the cause of the contraction has been removed: this definition has been by no means adhered to. The medicines which have been more particularly employed to procure sleep in a regular continued fever, and which are ranked among antispasmodic medicines, are æther and oleum vini, and sometimes musk, castor, and camphor. The author has very seldom seen the three last procure sleep in this disease; but a mixture of alcohol, æther and oleum vini, such as Hoffman strongly recommends under the name of liquor anodynus, and which is probably the same as the spiritus ætheris

ætheris vitriolici compositus of the London Dispensatory, the author has seen procure sleep in many instances in regular continued fever. The great drawback from depending on its powers is the uncertainty of its operation. Sometimes, given to the quantity of a dram in the evening, it procures a perfectly sound and quiet sleep; or if the like dose be repeated every six hours, sleep takes place at the ordinary hours of rest, quiet, sound, and refreshing. On the other hand it is to be observed, that its effects in producing sleep are perfectly uncertain, and that the patient is often just as restless after it has been exhibited as if he had taken no medicine at all: it happens even much more frequently that it does not produce any effect. Moreover, it cannot be distinguished, by any sensible appearance in the patient, in what cases it will produce an effect, or where it will not produce any effect at all. No bad effects, however, arise from employing it, as far as the author has been able to discern; there is, therefore, no reason for not employing it when the patient is restless and without sleep,

sleep, however capricious it may be in having this effect during the disease.

Where a regular continued fever is left to pursue its ordinary course, the efforts that take place in the fever, and the want of sufficient nourishment and sleep, frequently weaken the patient towards the end of the disease to such a degree as to be dangerous, and even in some cases fatal. It often happens likewise, that this weakness is greatly increased by evacuations which have been unnecessarily made by injudicious practitioners. Weakness is also induced by evacuations which arise from irregularity of the fever, and which consequently will become the subject of a future dissertation. Weakness also often takes place for want of food, first from the necessity of withholding food from the patient in sufficient quantity; if the patient should take in a larger quantity of food, from its not being digested and converted into blood, it must either be evacuated without change, or converted into water, and carried off by an effort which would still fur-

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ther diminish the force of the system. Weakness may be also produced by not exhibiting that quantity of food that may be digested, either from want of skill in the practitioner, or the carelessness of the attendant. What the quantity and quality of food are which ought to be given has already been described. Weakness may also be induced by practitioners employing medicines that occasion considerable efforts in the system, without diminishing the disease, although no improper evacuations have been made.

If no unnecessary evacuations have been made, if care has been taken to give food in such quantity and quality as the patient can digest during the progress of the disease, if the patient has not been exhausted by the application of improper medicines, it rarely happens that such a degree of weakness arises in a regular continued fever as to endanger the life of the patient.

If such a degree of weakness should, take place, at the end of a regular continued

tinued fever, as to endanger the life of the patient, the force of the body may in some degree be kept up, by employing medicines which will induce the powers of the system to act with all their force, until the fever shall so far diminish as to allow of the stomach digesting food of better nourishment, or the powers of the body to be recruited by sound and refreshing sleep. The practice of exciting the body to act with all its powers, until the fever is so far gone off, depends upon the following principle.

Let a patient ill of a regular continued fever be ever so weak at the time of the crisis, or at the time when the disease has gradually worn itself out; as soon as the fever is entirely terminated, provided the patient is allowed to be perfectly at rest, and if proper nourishment is exhibited to him, to wit, such as he can digest, the powers of the body begin instantly to be on the increase; therefore the patient will be gradually restored to his health again.

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Although there may be considerable power in the system, yet there may be a want of exertion of that power ; so that the patient may sink and die from weakness, though there are still in the body powers, which if they had been exerted might have kept the patient alive. By employing medicines to make the body exert these powers until the fever is gone off, the patient will be preserved, and afterwards gradually recover his strength.

If this was not the case, all stimulants employed in fever would evidently be extremely hurtful, for every extraordinary exertion tends to weaken the system, and to exhaust the powers that it brings into action ; and therefore if all the powers in the body were already in action, the increasing that action would weaken the system much more, and render the weakness more fatal, instead of preventing the patient from being destroyed by it. The stimulant employed must rouse the dormant powers, in order to have good effects.

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The medicines which have been employed for making those powers exert themselves that otherwise would not, are now to be treated of: the ordinary means of recruiting the strength in health by nourishment and sleep having already been attended to, as far as they have an effect in regular continued fevers. With what variation food and sleep are to be managed in a regular tertian has already been sufficiently argued, and what attention is to be paid to them in irregular continued remitting and intermitting fevers, will make part of future dissertations.

The author means here to take notice of the several different modes that practitioners have employed to excite the action of the living power, in regular continued fever, and give his opinion with regard to them, whatever has been the opinion of other practitioners of whatever estimation.

First then, many practitioners have endeavoured to excite the dormant powers of the body, for it is these only, as the author
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has just observed, that can be excited to advantage, by producing inflammation of the skin by the application of various stimulants.

If an inflammation is produced in the exterior parts of the body, so as to occasion any alteration in the system generally, if it be phlegmonous inflammation, the pulse becomes hard, full, strong and frequent, and there arises an universal sense of heat ; but the powers of digestion are impaired ; the patient loses his appetite, so that he cannot swallow so large a quantity of food ; the ordinary quantity of food which he makes use of in health, and of the ordinary quality, produces sickness and vomiting, or at least great uneasiness and disturbance throughout the whole body ; the faculties of the mind cannot be equally exerted, and especially the imagination and judgment ; the muscular powers are also diminished, a man cannot go through the same labour, the sleep is likewise prevented. Phlegmonous inflammation therefore prevents the body from being recruited

recruited by food and sleep, and the muscular powers of the body and the powers of the mind are considerably depressed. If an inflammation of the skin be produced in a man in health, otherwise an erysipelatous inflammation, so as to occasion affection of the general system, the pulse becomes much more frequent, often to one hundred and twenty strokes in a minute, or more; it also becomes smaller and weaker, the strength is generally depressed, and all the powers of the body and mind are in consequence less powerfully exerted. In a person otherwise in health, therefore, neither the inflammation of the substance of the exterior parts of the body, nor an inflammation of the skin, increase the powers of the system; on the contrary, they diminish the powers of the whole. If it were wished that a man should lift a greater weight, in order to enable him to make such greater exertion, no one would apply a blister to his back, or make a deep and painful wound in any part of his body. It is true, that we spur a horse to make him run swifter, but the greater exertion in this

case is from his endeavour to escape from pain.

Although then exciting any kind of inflammation by no means increases the force of the body otherwise in health, yet in health the actions of applications to any part of the body may have a very different effect from what the same applications would have, if they were made to the body when diseased. Whether exciting inflammation has or has not the same effect in a regular continued fever which it has in health, can only be known by making these applications to the body of a person affected with regular continued fever. As far as the author's experience goes, when any stimulus has been employed so as to produce inflammation, when a patient has become weak towards the end of a regular continued fever, the only difference that has occurred has been, that phlegmonous inflammation has not produced hardness, fulness, and strength of the pulse; but both phlegmonous inflammation and inflammation of the skin have occasioned greater frequency of the pulse,
have

have rendered it weaker and smaller, and, as in health, have prevented sleep, and the patient taking the same quantity of nourishment, and have depressed and deranged the whole system.

The author therefore concludes, that stimulants applied to the skin so far as to excite inflammation, by producing such inflammation, do not keep up the strength or make any dormant power act, but that on the contrary they weaken the patient; and that therefore exciting inflammation of the skin is not to be employed to keep up the strength, when weakness takes place towards the end of a regular continued fever.

When substances are applied to the skin so as to excite inflammation, such substances may be absorbed, carried into the general course of the circulation, and be applied to all the irritable parts of the body, and may so act upon some or all of these as to bring the dormant powers of the body into action, and so may keep up the strength towards the end of a regular continued fever.

It

It may be worth while, therefore, to enquire into the effects, which the substances employed commonly to excite inflammation of the exterior parts produce, when they are absorbed, get into the general course of circulation, and are applied to the various irritable parts.

The stimulating matter of cantharides has been very commonly employed to excite inflammation of the skin, and to keep up the strength towards the end of continued fevers.

That this matter is often absorbed there can be no question; it very frequently, in consequence of being absorbed, produces inflammation of the neck of the bladder, which we call strangury; when it produces this effect, the pain and constant sense of uneasiness irritate and exhaust the patient at all times. Every practitioner who has employed cantharides to excite inflammation, and attended to their effects, must have observed them often, when absorbed, produce subfultus tendinum, convulsions and hysteric

ric fits, all of which are certainly very far from keeping up the strength in continued fevers.

In like manner, if we examine any other stimulant which has been employed to excite inflammation externally, in order to keep up the strength towards the end of a continued fever, we shall find that when they are absorbed they produce effects upon the irritable parts of the body, which are not at all conducive to support the strength towards the end of continued fevers.

The author, therefore, is obliged to reject the excitement of inflammation of the exterior parts of the body, as a means of supporting the strength towards the end of continued fever. He does not say, however, that it may not be proper to excite external inflammation for other purposes in regular continued fevers; but this will be a matter of future consideration.

The

The next means of exciting the action of the dormant powers of the body, so as to make them act in such manner as to support the strength at the end of a continued fever, when the patient is weak, is the application of substances which act upon the stomach itself, and by that means to excite the other parts of the system to exert themselves powerfully. The first kind of these to be enumerated is that class of plants, called by Linnæus *Tetradynamia*, together with the several species of *Allium*, and likewise *Ammonia*.

These stimulants, when thrown into the stomach, act upon it immediately, long before there is time for them to get into the blood-vessels; their effects go off also in an hour or two, and while they produce any effect, it is principally that of making the pulse more frequent, without increasing its strength or fulness. Such stimulants have therefore been properly rejected from the remedies fit to be employed, to make the dormant strength of the system be exerted towards the end of continued fevers.

The

The gums, as they were formerly called, are the resinous substances which exude from yegetables, forming either a pure resin, or a mixture of mucilaginous and resinous matter. Neither these, nor preparations of mercury, seem to act upon the system generally, when they are immediately thrown into the stomach, but require some days before they produce any effect, being probably absorbed, and applied to the several irritable parts in the system. Of these, mercury is much too apt to produce evacuations to be trusted, lest such evacuations should weaken the patient much more, and even to that degree as to destroy him; and the resinous substances pointed out have not been so much made use of, as that we can determine the propriety of their exhibition. The author indeed has seen them employed, but if he remembers right, without any great effect.

The spices, such as cinnamon, nutmegs, cloves, pepper and cardamoms, have been very often and very much employed to keep up the strength in continued fever. They
are

are not nearly so much in use at present, as they were about fifty years ago. When they have any sensible effect, they render the pulse much more frequent, smaller and weaker; hence they are certainly improper. It is true, indeed, that by adding a quantity of acid to them the frequency of the pulse is reduced, and is in some way in a certain degree prevented; they are, however, in general very improper remedies for this purpose, except when there is a great deal of flatulency in the primæ viæ, which depresses the strength of the patient; he is therefore relieved when this flatulency is carried off, which effect these spices are powerful in producing.

Wine seems to be the only remedy that is of use to excite the dormant strength of the system, when weakness takes place towards the end of continued fevers. It tends to increase the force of the system, without increasing the frequency of the action of the heart, and on this ground it may be more safely employed than any other stimulant. It has also a narcotic power.

Wine

Wine should be employed in moderate quantity ; when exhibited in large quantity it produces intoxication, the effects of which every man who has drunk it in such quantity very easily perceives. The stomach, after the intoxication is gone off, is disordered, spasmodic contractions take place in it, and it is not capable of digesting food, which last effect would render the patient weaker from want of receiving sufficient nourishment ; it should be used, therefore, sparingly, and not in the least to intoxicate.

It ought only to be employed, when the weakness has just become considerable, in moderate quantity ; for if we exhibit it in greater quantity than is sufficient to make such part of the dormant strength of the system, as is required, to be exerted, it will exhaust that dormant strength, and not leave a sufficient quantity to support the patient during the remaining part of the disease.

When

When wine is first employed by persons not accustomed to use it, where it becomes necessary to employ it from weakness, four ounces is a sufficient quantity of wine of the strength of Port wine. The strength of wines can hardly be transmitted to posterity by any permanent mark, for the strength does not depend on the alcohol they contain, but likewise on the quantity of a vapour, which was called by Van Helmont gas silvestre, probably different from that vapour which he called gas simply, and which has since been called fixed air and carbonic acid, although the author thinks these improper names; that, however, is foreign to the purpose of this dissertation.

The author has also to observe, that in patients who have been accustomed to drink wine even in large quantities, three half pints are quite sufficient to be exhibited in twenty-four hours.

If wine is made use of it should be well fermented; it is very rare that weak wines are well fermented, it is better then that
strong

that strong wines should be used; sweet wines are perhaps preferable from the nourishment contained in them, but they are seldom well fermented, except they be very old: if not well fermented, they are aced and flatulent.

It has been a question whether it is better to employ the wine by itself, or diluted with the farinaceous or mucilaginous vegetable substances we employ for nourishment to the patient. It appears to the author, that they should be diluted with farinaceous or mucilaginous substances mixed with sugar, as these take off the immediate stimulus with which wine, when strong and pure, is apt to act upon the stomach. On the same ground the author would perhaps condemn all distilled spirits, excepting in some sudden cases of extreme weakness, such as happens from too copious an evacuation from any excretory organ in the body.

The author has now shown the means of treating a regular continued fever, supposing it is left to pursue its ordinary course.

The next thing to be enquired into is, whether means have been found out to shorten the fever by producing a crisis, or otherwise, so that the patient shall be restored to health.

This enquiry will lead the author to consider whether bleeding, either from any vessel in the body indiscriminately, or from some particular vessel in a particular part of the body, has the power of carrying off the fever.

Whether purging, or making any other evacuation to any degree, has a power of carrying off a regular continued fever.

Whether exciting inflammation in the skin, or in any other part, has any power of carrying off a regular continued fever.

Whether Peruvian bark, or any other remedy acting on the same principle, has any power of carrying off a regular continued fever.

Whether stimulants, such as spices, have
any

any power of carrying off a regular continued fever.

Whether antispasmodic remedies have any power of carrying off a regular continued fever.

Whether there be any medicine which carries off a regular continued fever, that has no apparent action on the body when in health, or affected with other diseases.

Whether preparations of antimony, or ipecacuanha, or those other medicines which have been enumerated in the dissertation on a regular tertian, as bringing on a crisis similar to that which takes place in fever itself, or render it more perfect, have any power of carrying off regular continued fevers.

If symptoms of putrefaction of the fluids should arise, whether any remedy, and what remedies may be employed to restore them to their healthy state.

If hæmorrhage should arise in consequence
of

of putrefaction, whether any remedy, and what remedies may be employed to stop such hæmorrhage.

Lastly, if any of these remedies have a power of carrying off or diminishing a regular continued fever, in what manner they are to be employed for this purpose, and what circumstances may make it improper to exhibit them.

These enquiries will form the second part of this dissertation, which is in great forwardness.

END OF THE FIRST PART.